802.11n
WiFi Repeater

User's Manual

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1 Introduction

Congratulations on becoming the owner of the 802.11n WiFi Repeater. You will now be able to access the Internet using your high-speed xDSL/Cable modem connection.

This User Guide will show you how to connect your 802.11n WiFi Repeater, and how to customize its configuration to get the most out of your new product.

Features

The list below contains the main features of the device and may be useful to users with knowledge of networking protocols. If you are not an experienced user, the chapters throughout this guide will provide you with enough information to get the most out of your device.

Features include:

- Network address translation (NAT) functions to provide security for your LAN
- Network configuration through DHCP Server and DHCP Client
- User-friendly configuration program accessed via a web browser

The 802.11n WiFi Repeater has the Wireless Interface allows for a direct connection to a Wireless network via an Wireless interface, with WLAN connectivity for both the 802.11n WiFi Repeater and a co-located PC or other Wireless-based device.

Device Requirements

In order to use the 802.11n WiFi Repeater, you must have the following:

- One Broadband Internet connection via Wireless cable modem or xDSL modem
- Instructions from your ISP on what type of Internet access you will be using, and the addresses needed to set up access
- One or more computers each containing an Wireless LAN card
- TCP/IP protocol for each PC
- For system configuration using the supplied
  a. web-based program: a web browser such as Internet Explorer v4 or later, or Netscape v4 or later. Note that version 4 of each browser is the minimum version requirement – for optimum display quality, use Internet Explorer v5, or Netscape v6.1

Using this Document

Notational conventions

- Acronyms are defined the first time they appear in the text and also in the glossary.
- For brevity, the 802.11n WiFi Repeater is referred to as "the device".

Typographical conventions

- *Italic* text is used for items you select from menus and drop-down lists and the names of displayed web pages.
- **Bold** text is used for text strings that you type when prompted by the program, and to emphasize important points.

Special messages

This document uses the following icons to draw your attention to specific instructions or explanations.

Note

Provides clarifying or non-essential information on the current topic.

Definition

Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.

WARNING

Provides messages of high importance, including messages relating to personal safety or system integrity.

Getting Support

Supplied by:
Helpdesk Number:
Website:

2 Getting to know the device

Computer / System requirements

- 1. Pentium 200MHZ processor or above
- 2. Windows 98SE, Windows Me, Windows 2000, Windows XP, Windows Vista, Windows 7 and Windows 8
- 3. 64MB of RAM or above
- 4. 25MB free disk space

Package Contents

1. 802.11n WiFi Repeater
2. CD-ROM (Software & Manual)
3. Quick Installation Guide

LED meanings & activations

Top Side

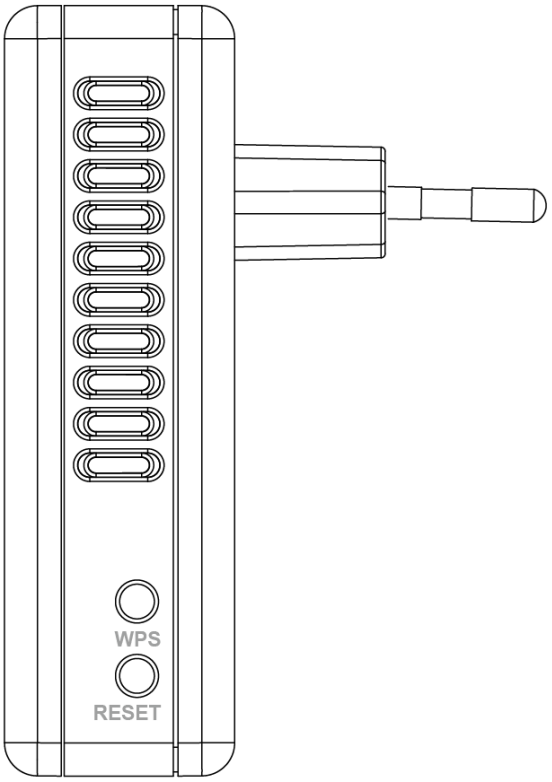
The Top Side contains lights called Light Emitting Diodes (LEDs) that indicate the status of the unit.

Figure 1: Top Side and LEDs

Label	Color	Function
POWER	green	On: device is powered on Off: device is powered off
WLAN	green	On: WLAN link established and active Blink: Valid Wireless packet being transferred
WPS	green	On: Internet Connection established and active Off: WPS link isn't established and active Blink: Valid WPS packet being transferred

Rear and Left Panel and bottom Side

The rear and right panel and bottom side contains a *Restore Defaults* button, the ports for the unit's data and power connections.



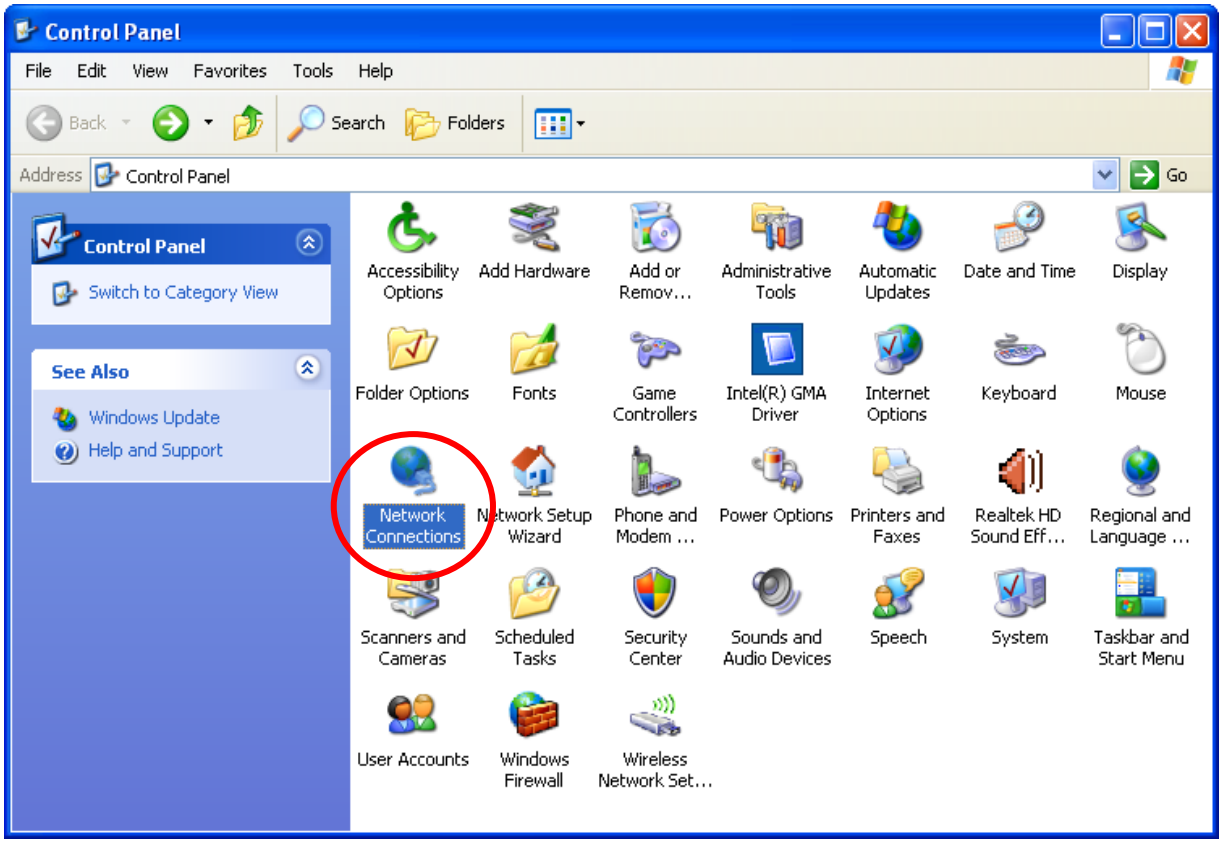
Label	Function
WPS	Press this button for at least 3 full seconds and the WPS LED will flash to start WPS. Now go to the wireless adapter or device and press its WPS button. Make sure to press the button within 120 seconds (2 minutes) after pressing the Repeater's WPS button.
RESET	Reset button. **RESET** the 802.11n WiFi Repeater to its default settings. Press this button for at least 6 full seconds to **RESET** device to its default settings.

3 Computer configurations under different OS, to obtain IP address automatically

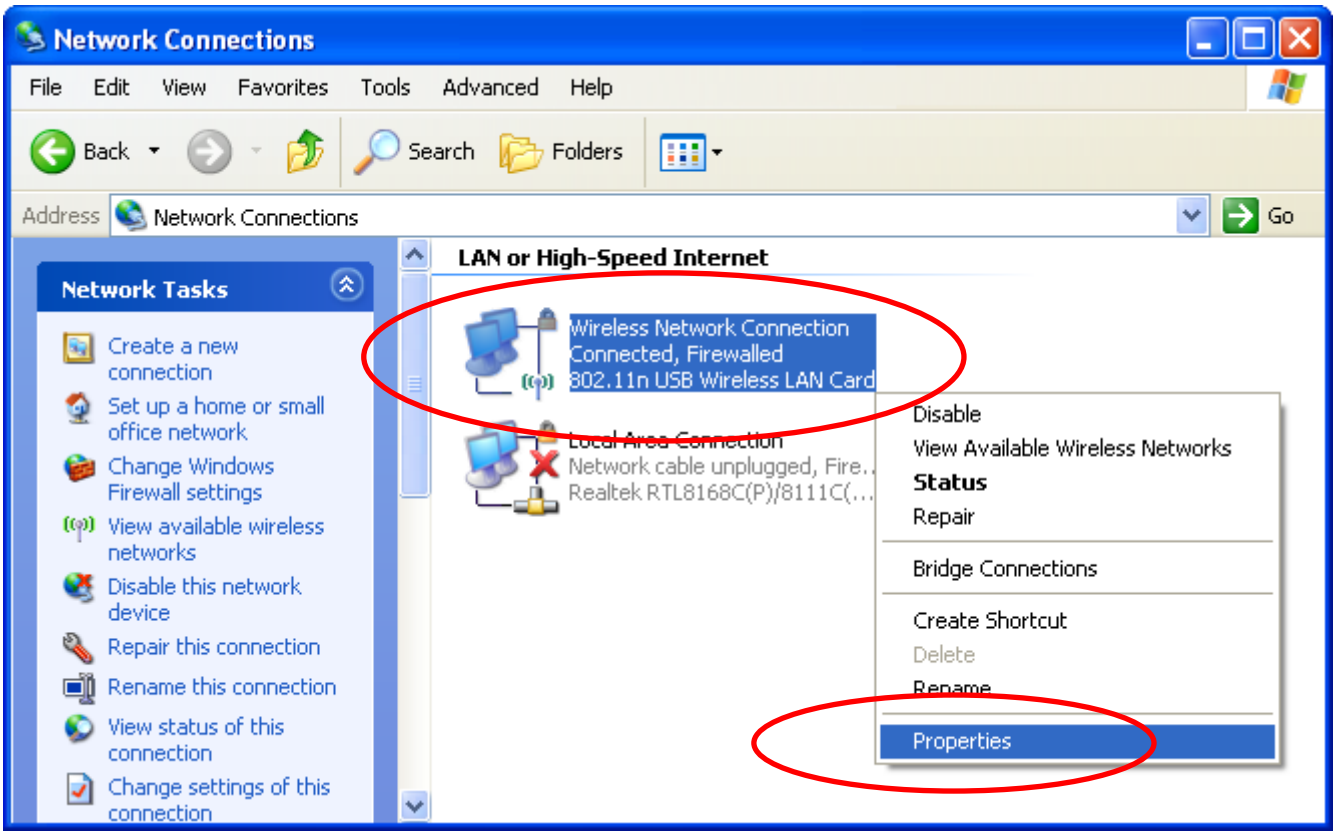
Before starting the 802.11n WiFi Repeater configuration, please kindly configure the PC computer as below, to have automatic IP address / DNS Server.

For Windows 98SE / ME / 2000 / XP

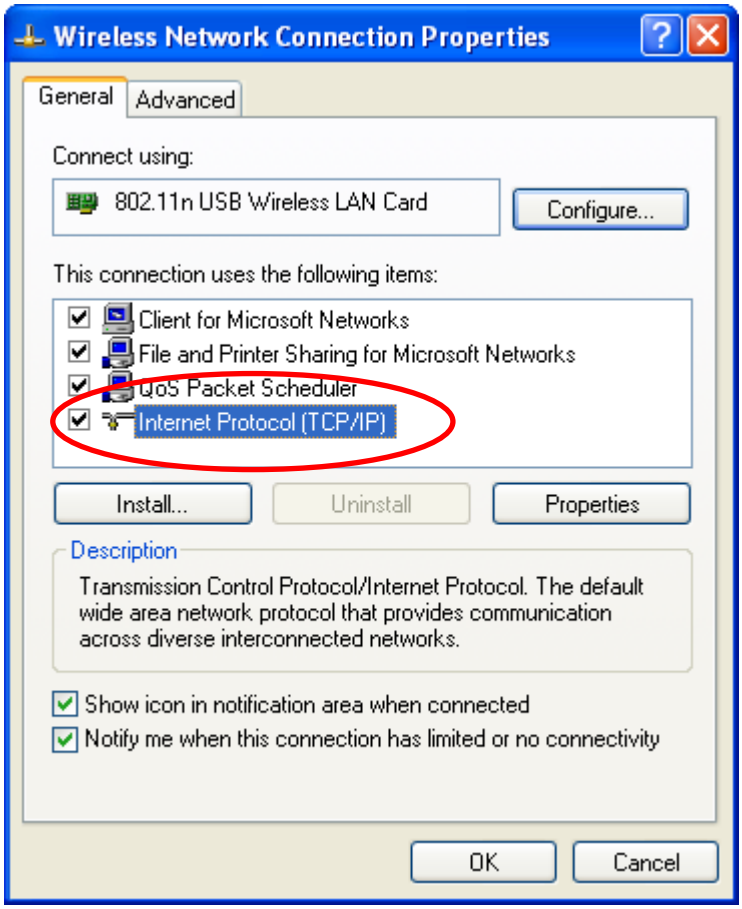
1. Click on "**Start**" -> "**Control Panel**" **(in Classic View)**. In the Control Panel, double click on "**Network Connections**" to continue.



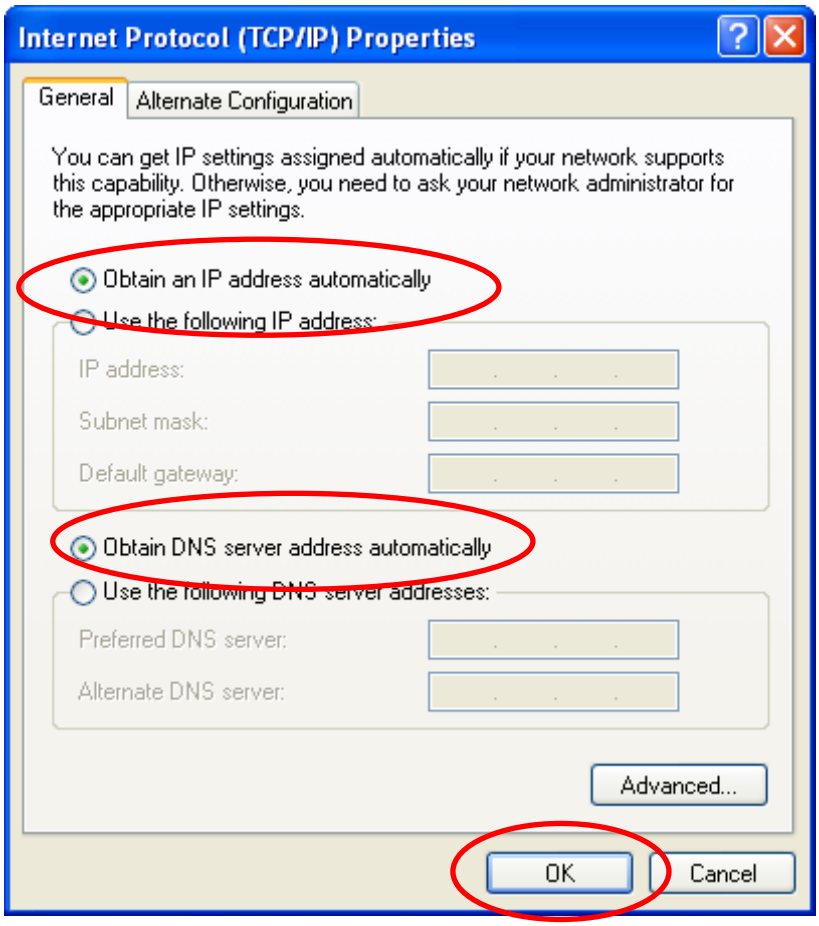
2. Single RIGHT click on " **Wireless Network Connection** ", then click "**Properties**".



3. Double click on "**Internet Protocol (TCP/IP)**".


Wireless Network Connection Properties
General
Advanced
Connect using:
802.11n USB Wireless LAN Card
Configure...
This connection uses the following items:
Client for Microsoft Networks
File and Printer Sharing for Microsoft Networks
QoS Packet Scheduler
Internet Protocol (TCP/IP)
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in notification area when connected
Notify me when this connection has limited or no connectivity
OK
Cancel

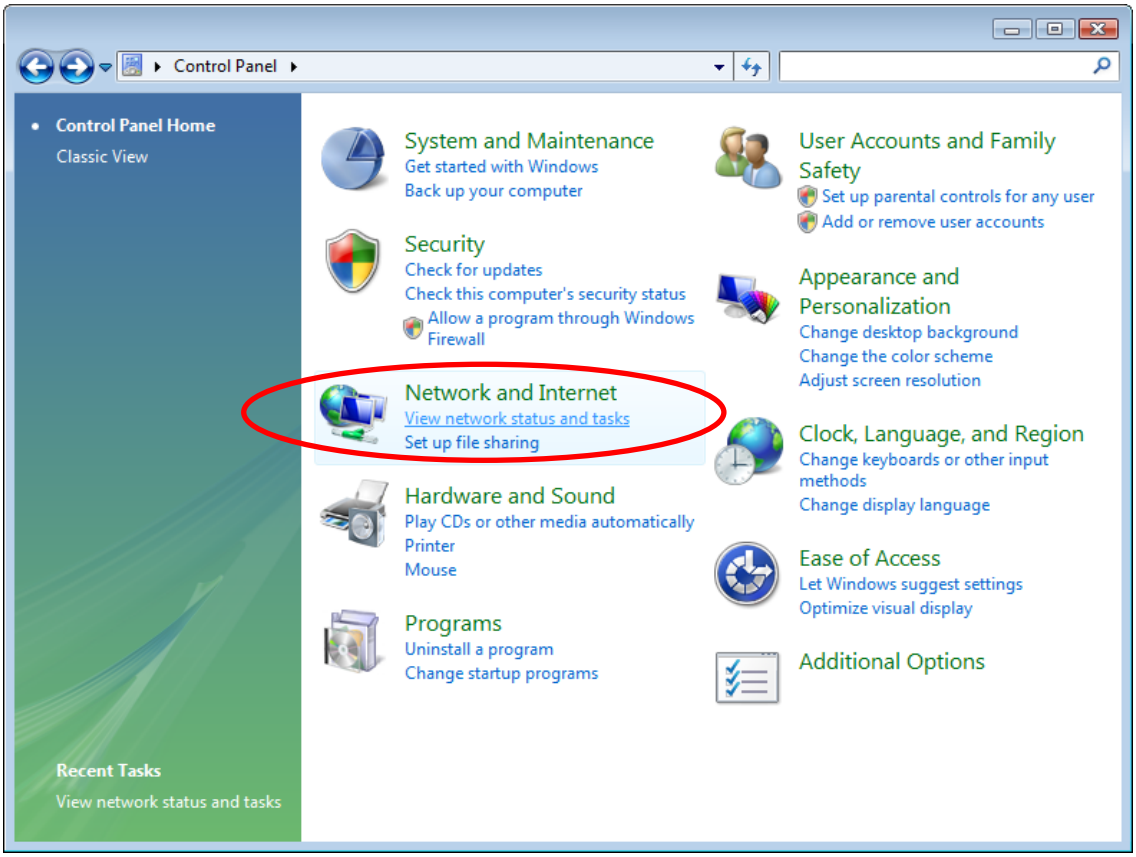
4. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.


Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

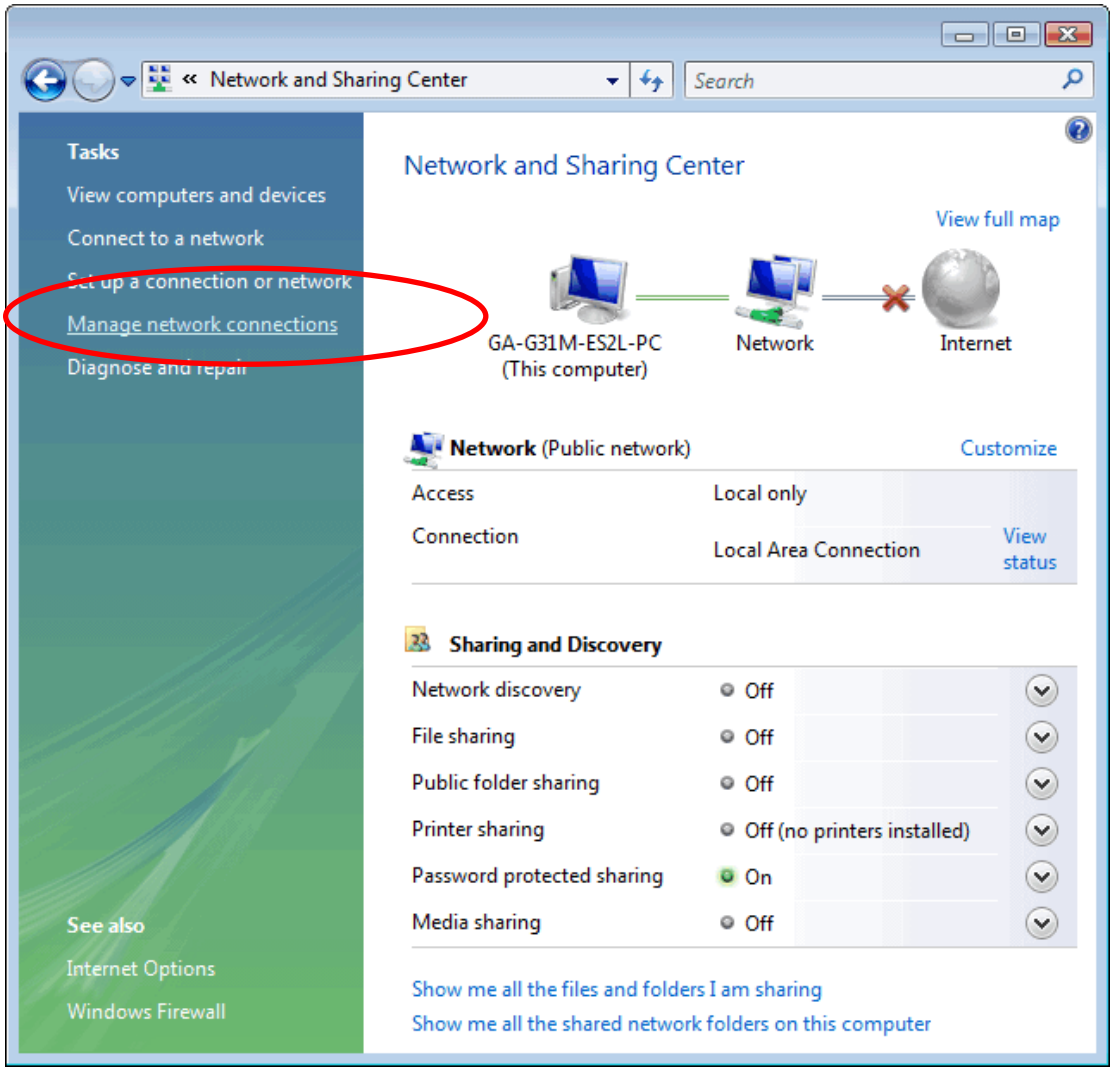
5. Click "**Show icon in notification area when connected**" (see screen image in 3. above) then Click on "**OK**" to complete the setup procedures.

For Windows Vista-32/64

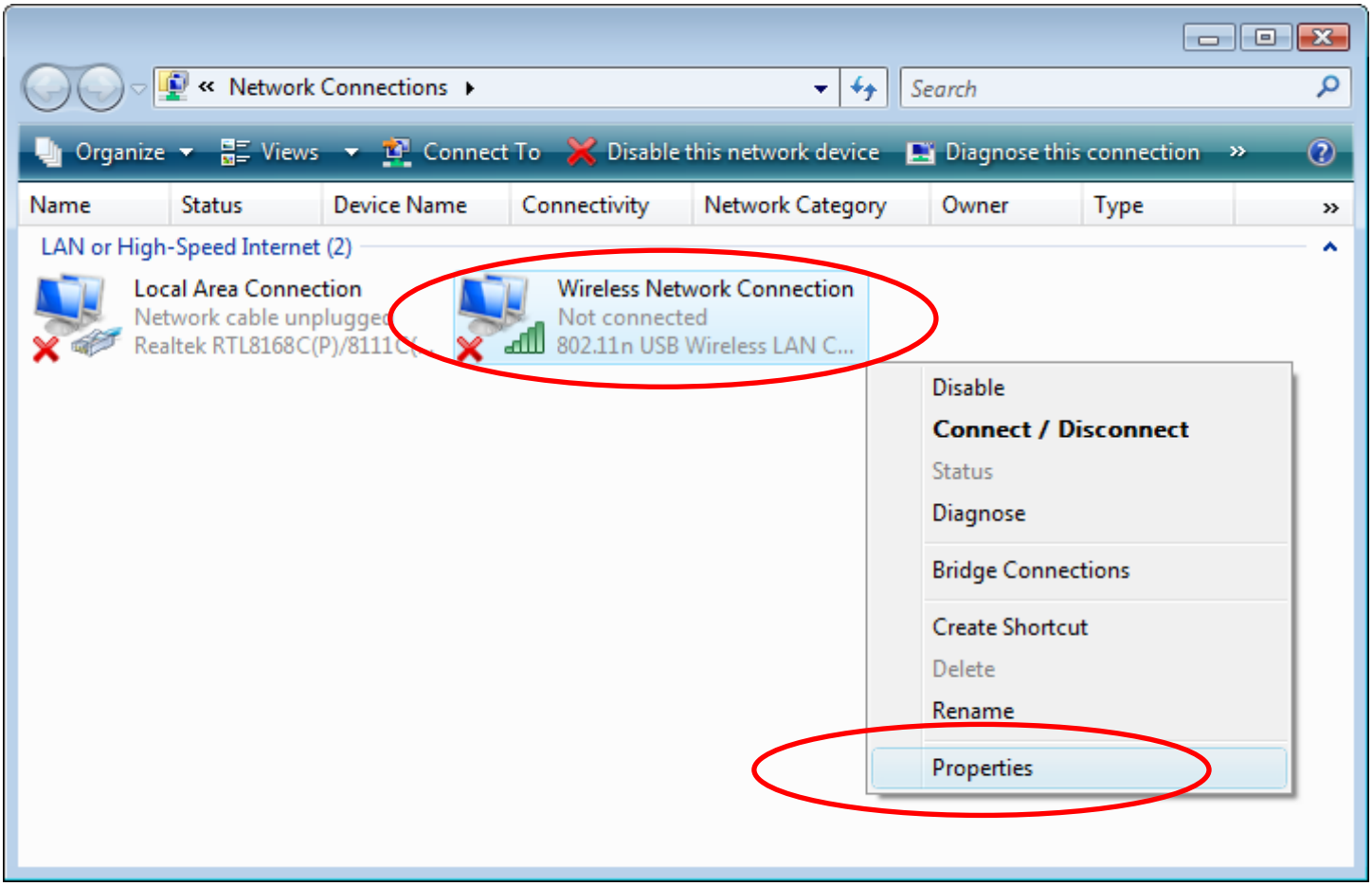
1. Click on "**Start**" -> "**Control Panel**" -> "**View network status and tasks**".



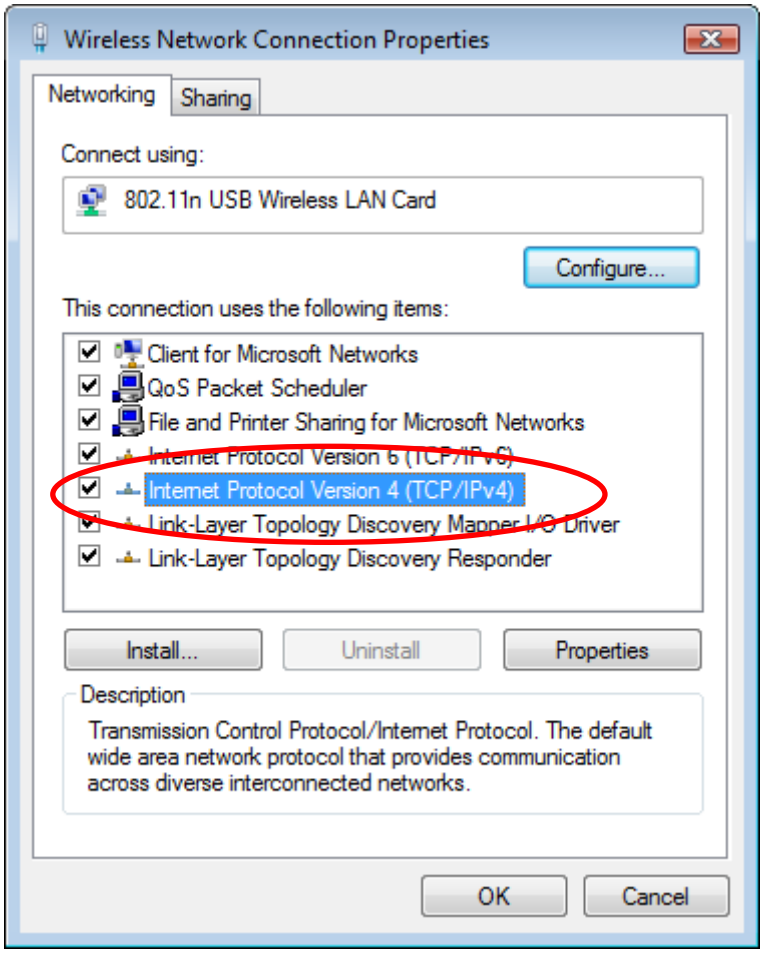
2. In the Manage network connections, click on "**Manage network connections**" to continue.



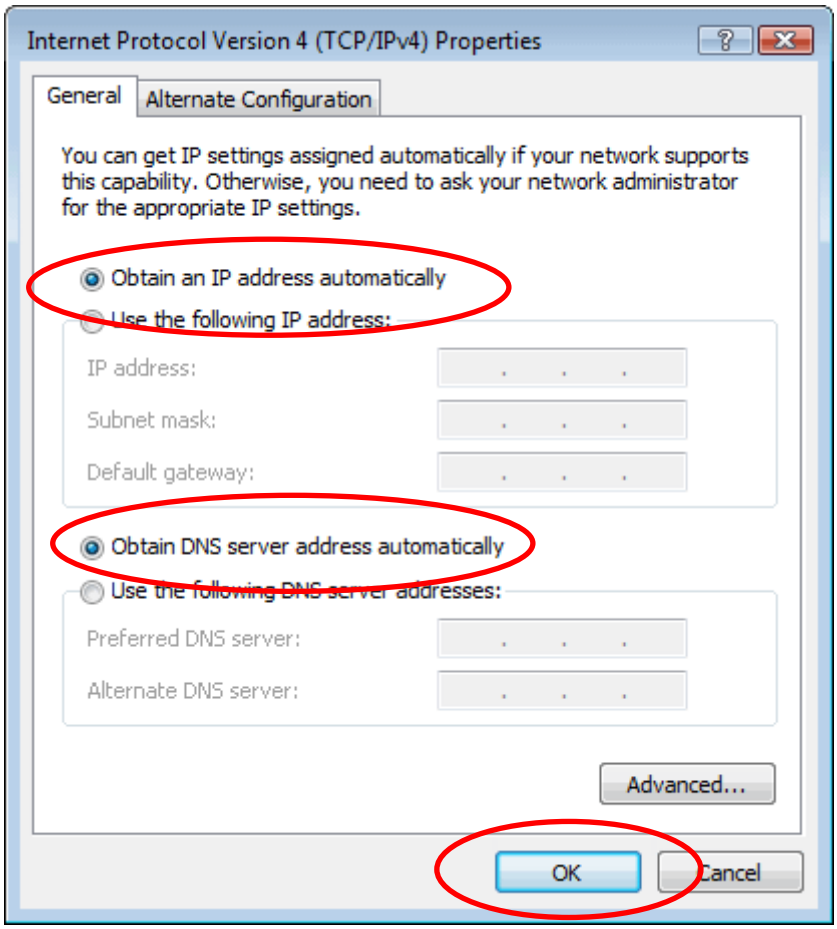
3. Single RIGHT click on "**Wireless Network Connection**", then click "**Properties**".



4. The screen will display the information "**User Account Control**" and click "**Continue**" to continue.
5. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".

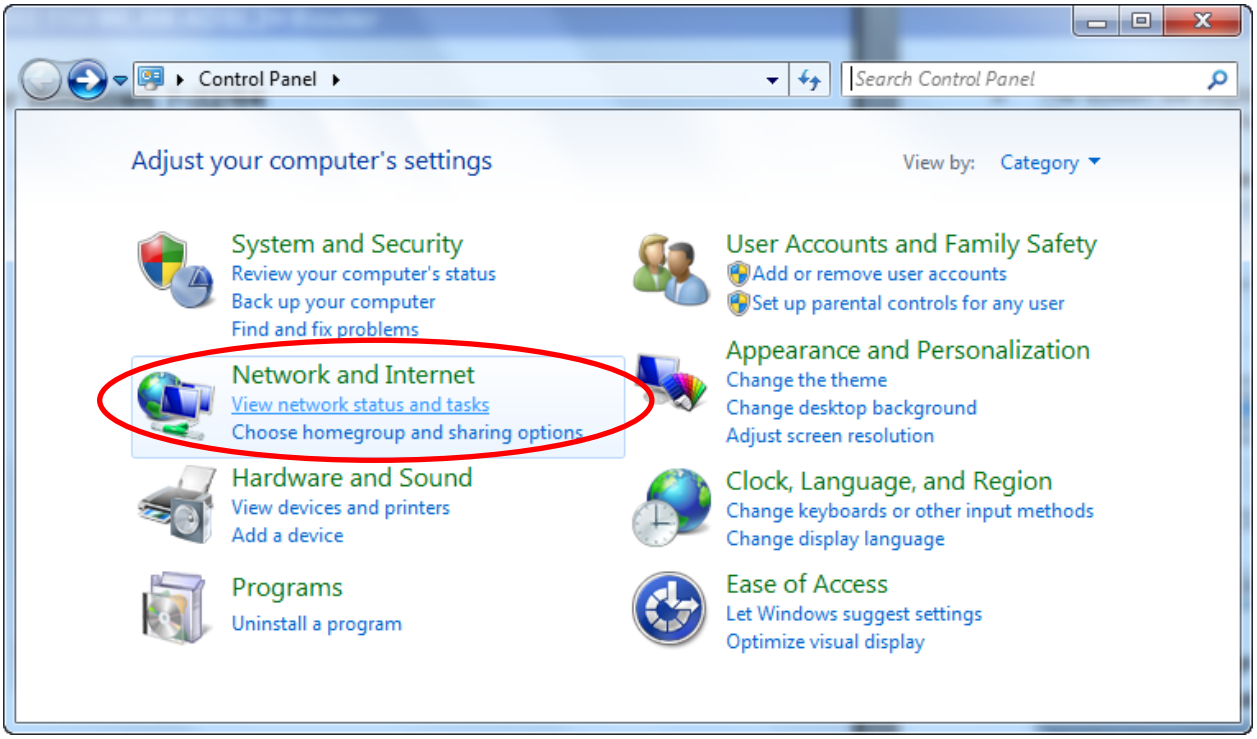


6. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.

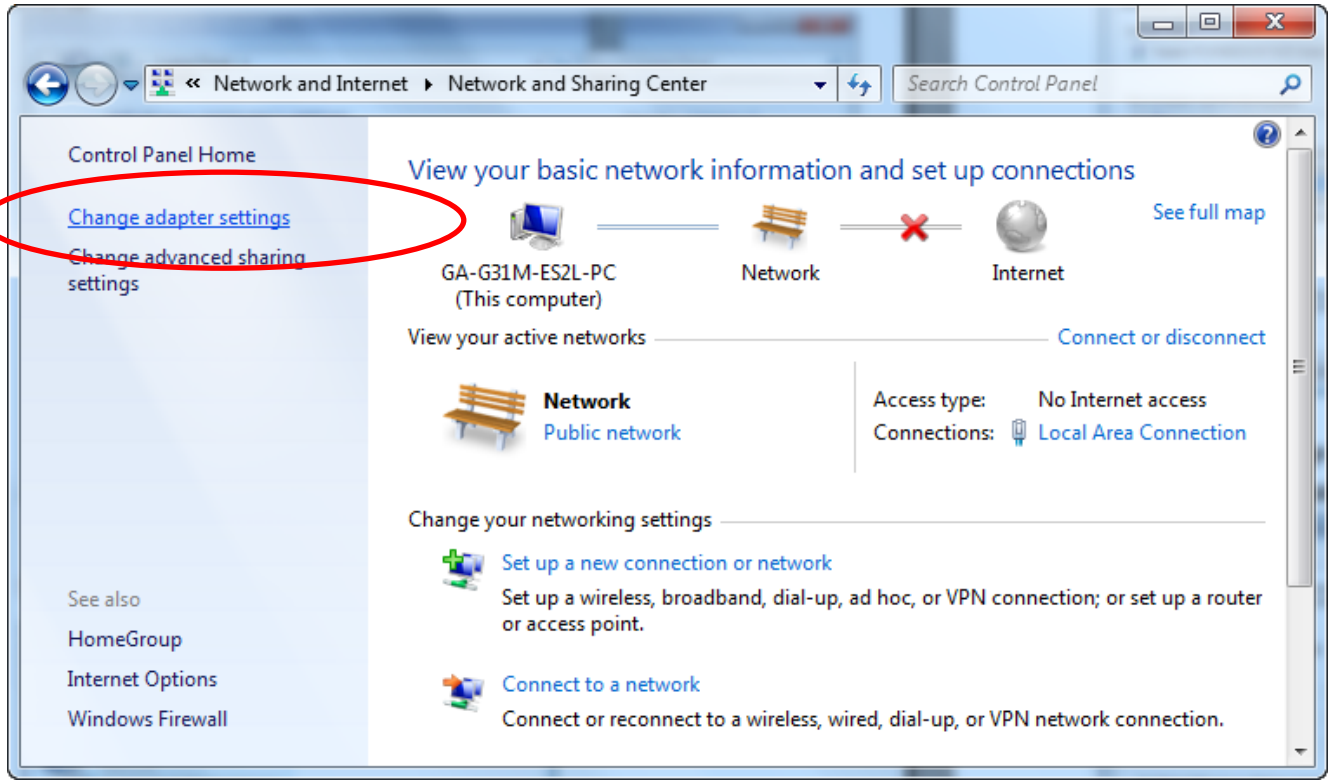

Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

For Windows 7-32/64

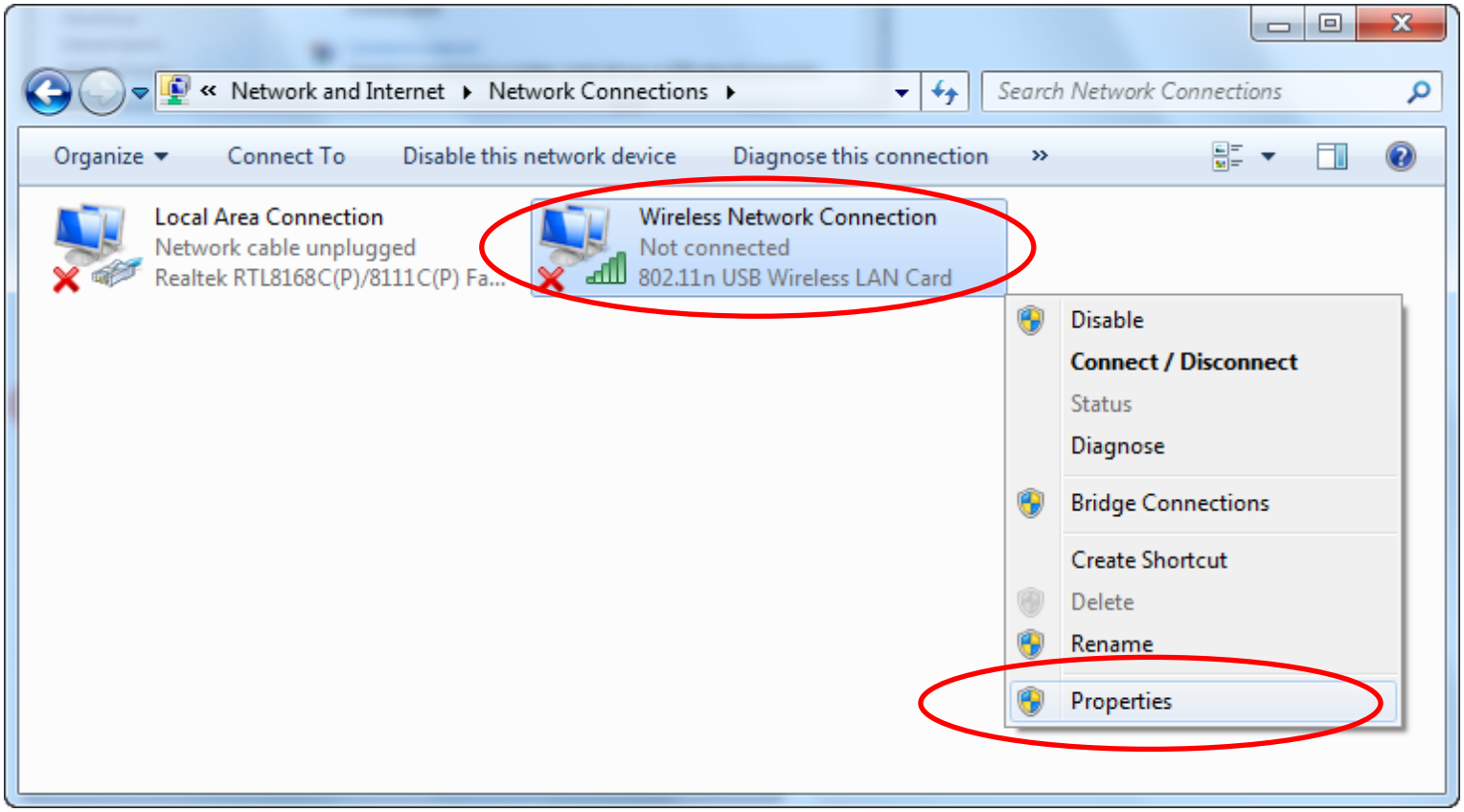
1. Click on "**Start**" -> "**Control Panel**" **(in Category View)** -> "**View network status and tasks**".



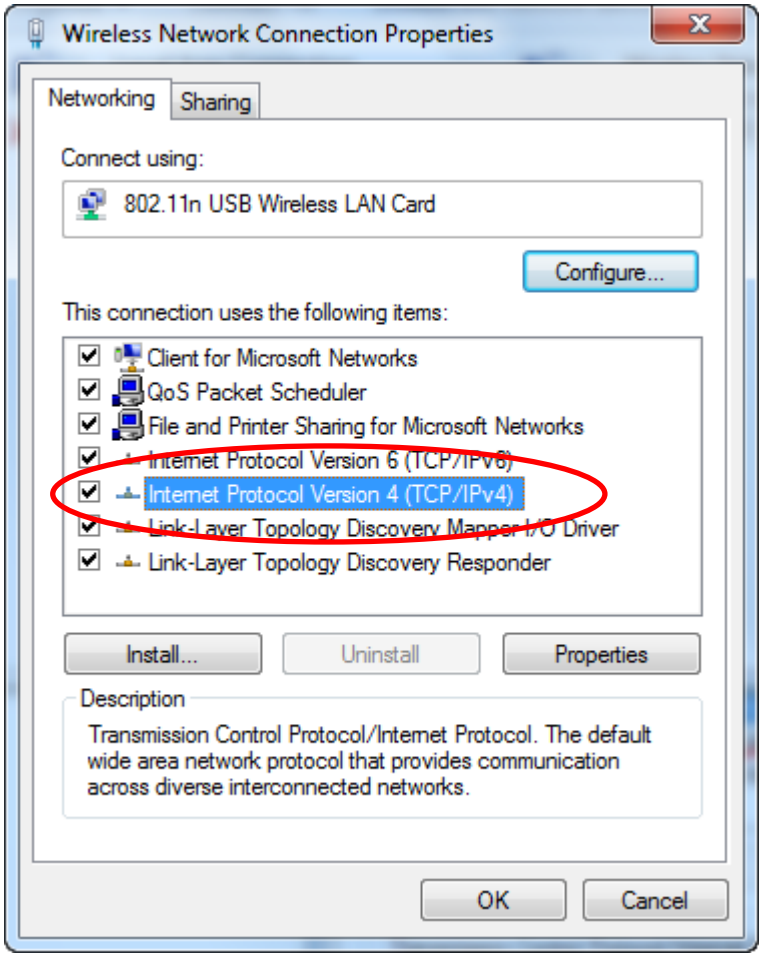
2. In the Control Panel Home, click on "**Change adapter settings**" to continue.


« Network and Internet ▸ Network and Sharing Center
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
See full map
GA-G31M-ES2L-PC (This computer)
Network
Internet
View your active networks
Connect or disconnect
Network
Public network
Access type: No Internet access
Connections: Local Area Connection
Change your networking settings
Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.
Connect to a network
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.
See also
HomeGroup
Internet Options
Windows Firewall

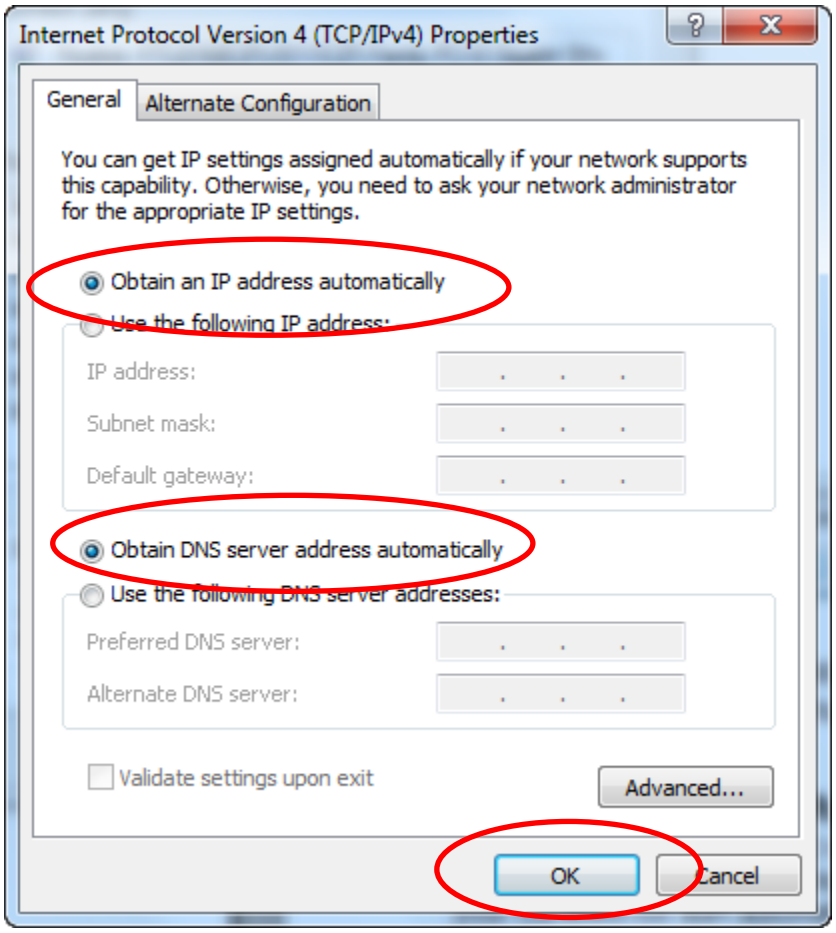
3. Single RIGHT click on "**Wireless Network Connection**", then click "**Properties**".



4. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".

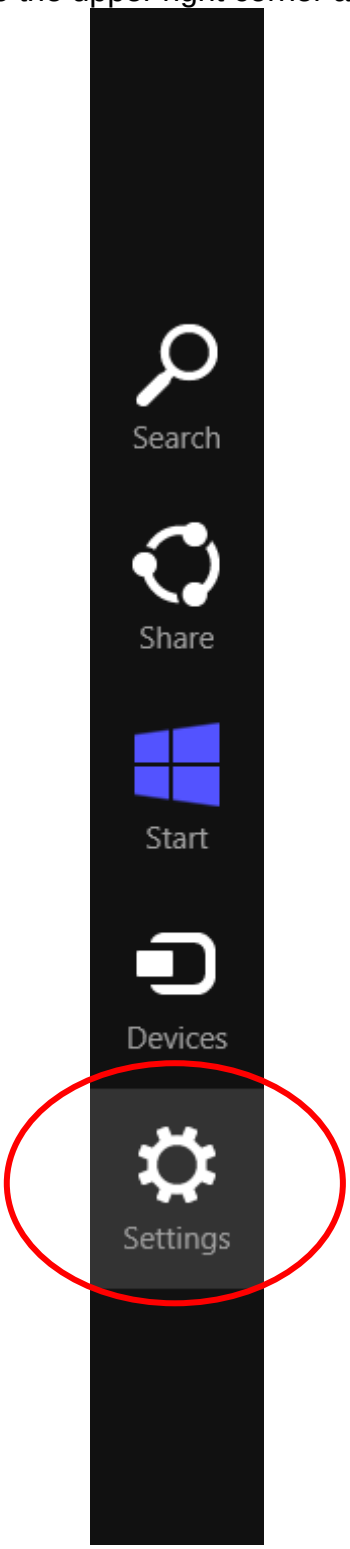


5. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.

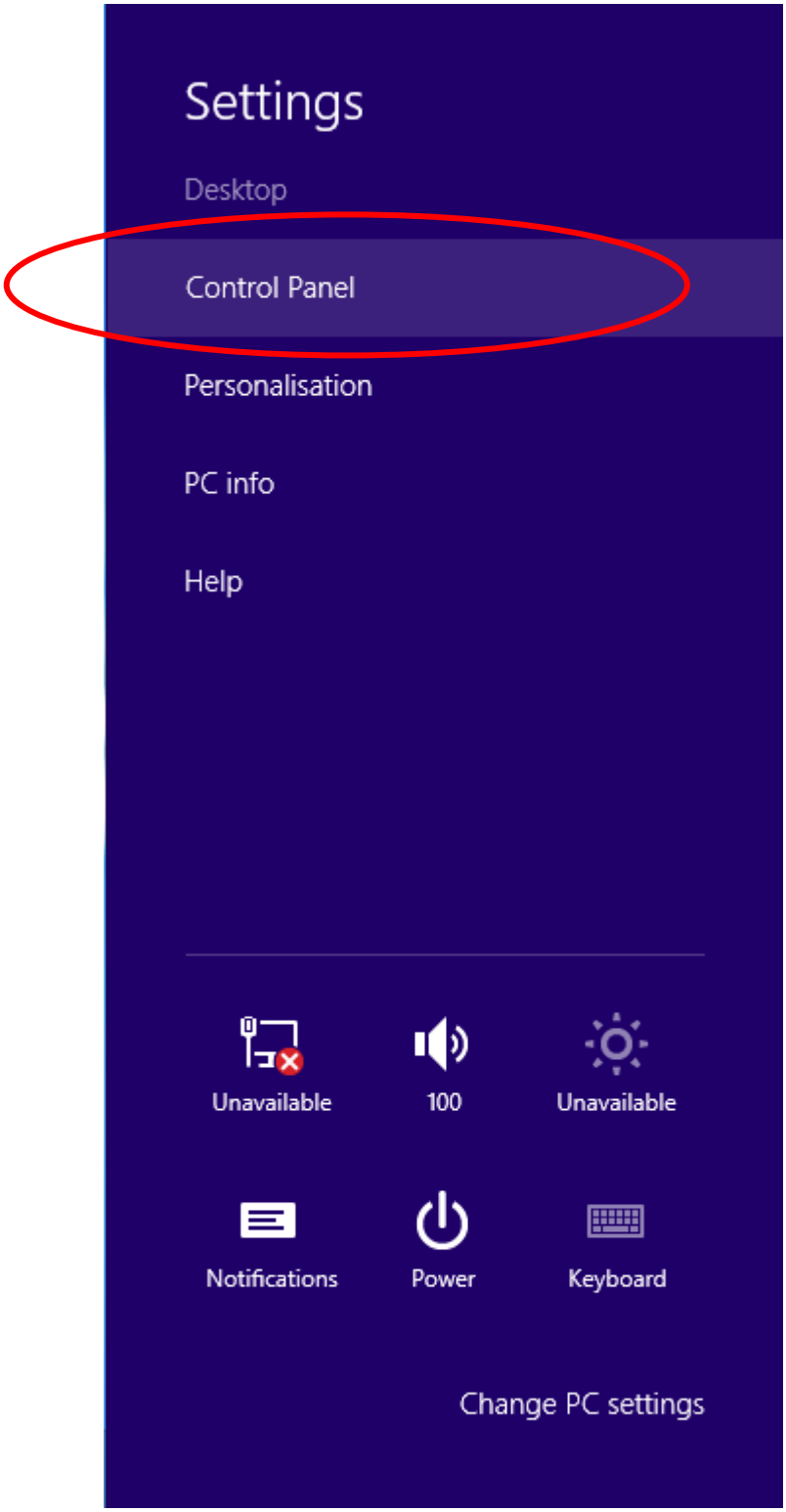

Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

For Windows 8-32/64

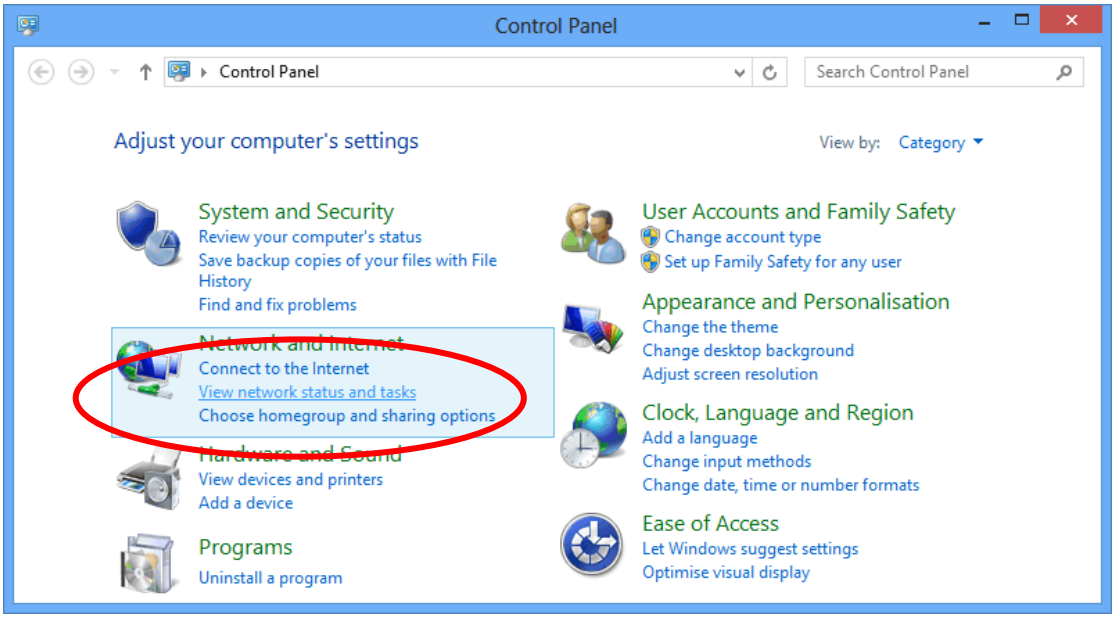
1. Move the mouse or tap to the upper right corner and click on "**Settings**".



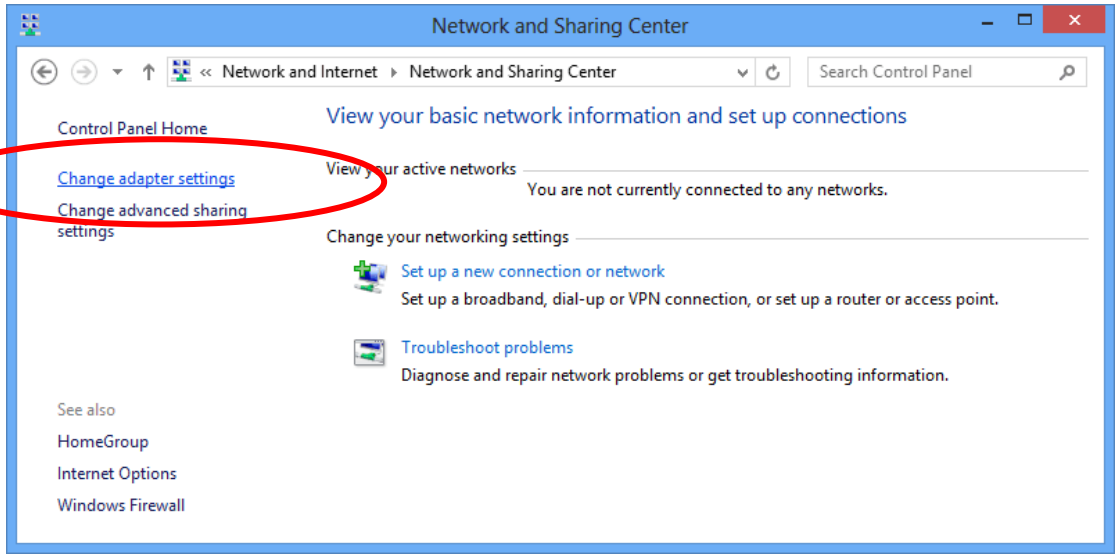
2. Click on "**Control Panel**".



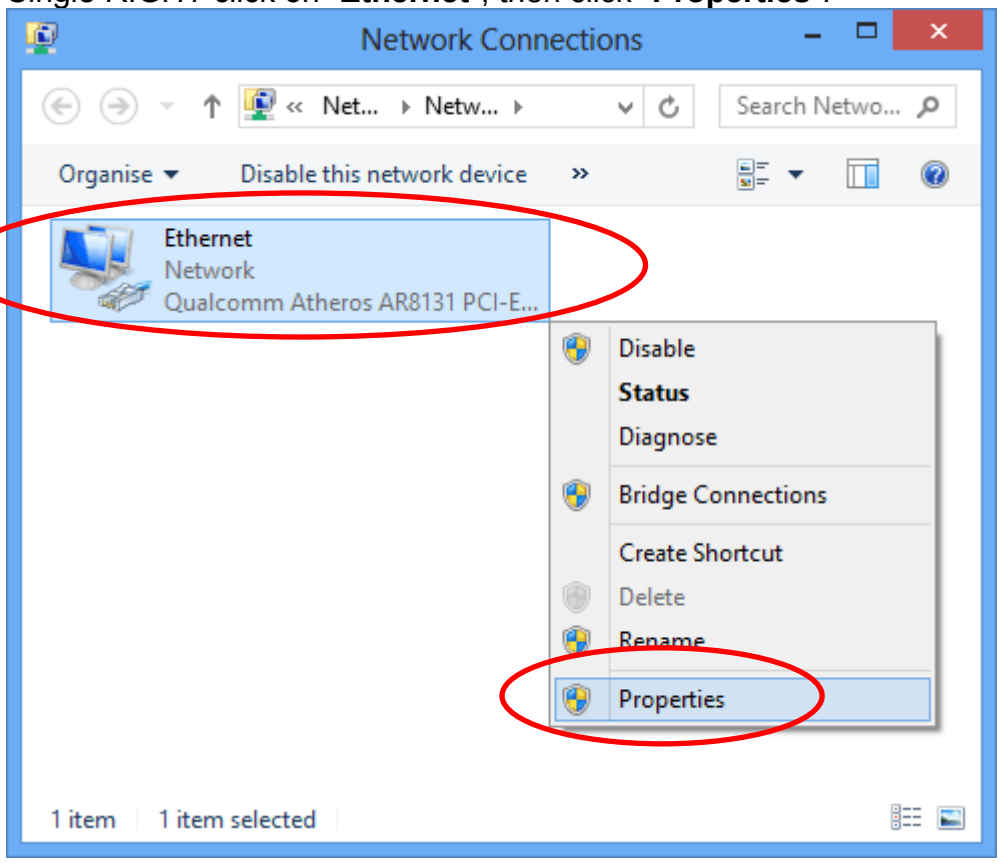
3. Click on "**View network status and tasks**".



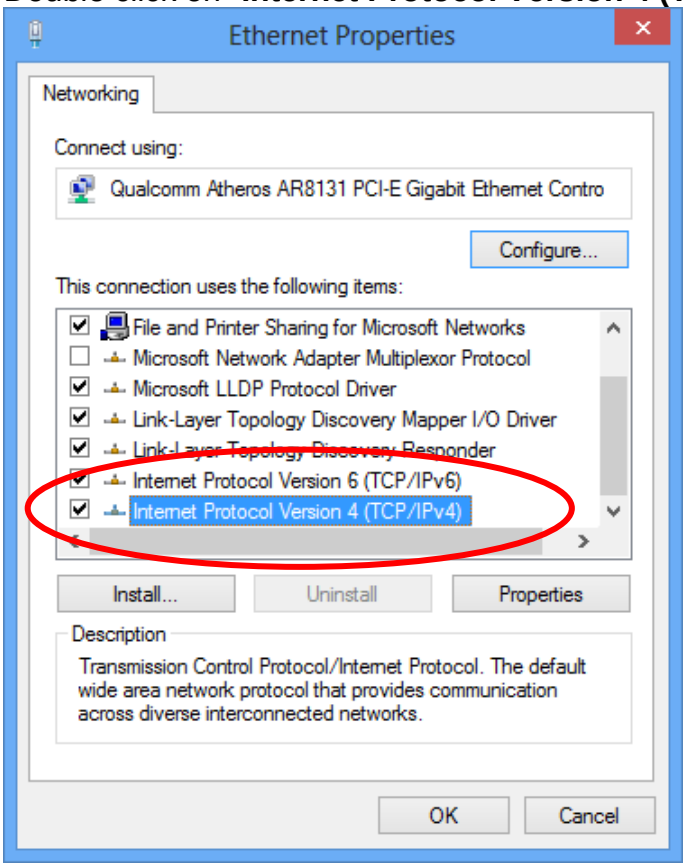
4. In the Control Panel Home, click on "**Change adapter settings**" to continue.


Network and Sharing Center
« Network and Internet ▸ Network and Sharing Center
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
View your active networks
You are not currently connected to any networks.
Change your networking settings
Set up a new connection or network
Set up a broadband, dial-up or VPN connection, or set up a router or access point.
Troubleshoot problems
Diagnose and repair network problems or get troubleshooting information.
See also
HomeGroup
Internet Options
Windows Firewall

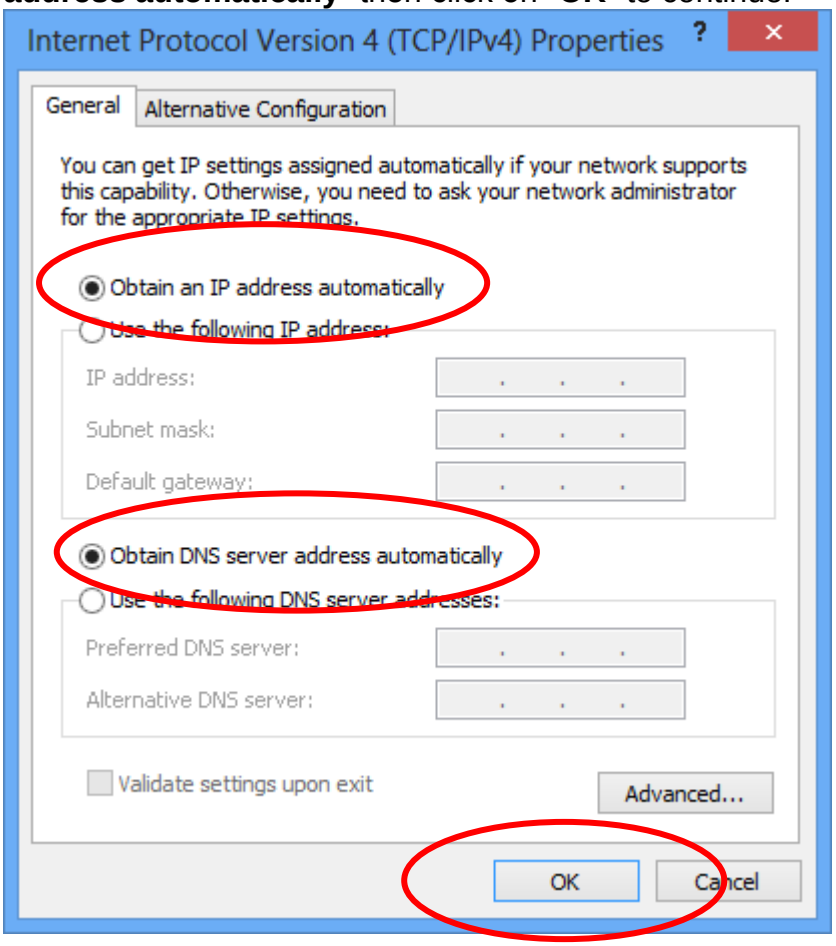
5. Single RIGHT click on "**Ethernet**", then click "**Properties**".



6. Double click on "**Internet Protocol Version 4 (TCP/IPv4)**".



7. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternative Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternative DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

4 Connecting your device

This chapter provides basic instructions for connecting the device to a computer or WLAN and to the Internet.

In addition to configuring the device, you need to configure the Internet properties of your computer(s). For more details, see the following sections:

- *Configuring Ethernet PCs*

This chapter assumes that you have already established a DSL/Cable service with your Internet service provider (ISP). These instructions provide a basic configuration that should be compatible with your home or small office network setup. Refer to the subsequent chapters for additional configuration instructions.

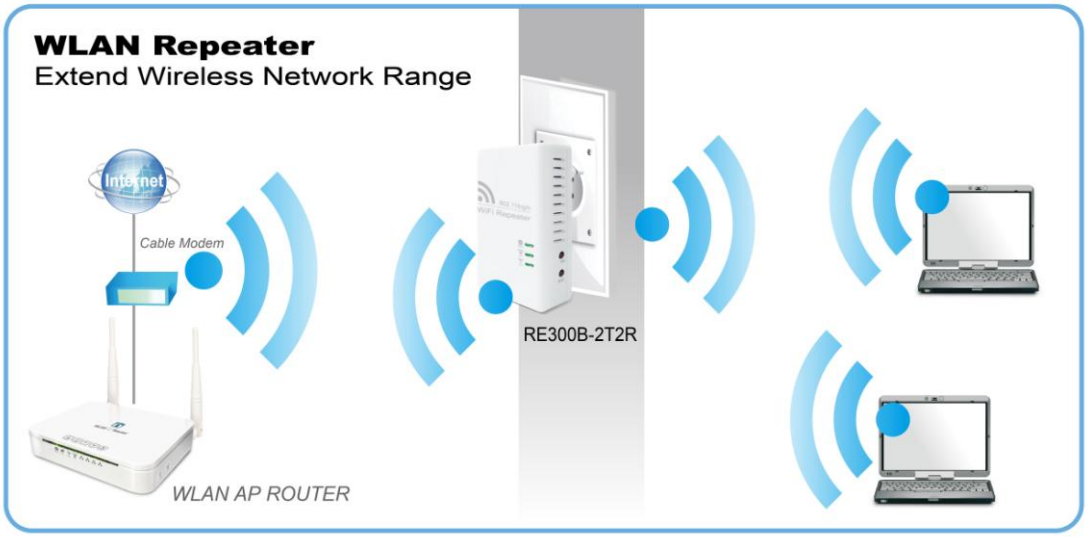
Connecting the Hardware

This section describes how to connect the device to the wall phone port, the power outlet and your computer(s) or network.

WARNING

Before you begin, turn the power off for all devices. *These include your computer(s), your LAN hub/switch (if applicable), and the device.*

The diagram below illustrates the hardware connections. The layout of the ports on your device may vary from the layout shown. Refer to the steps that follow for specific instructions.



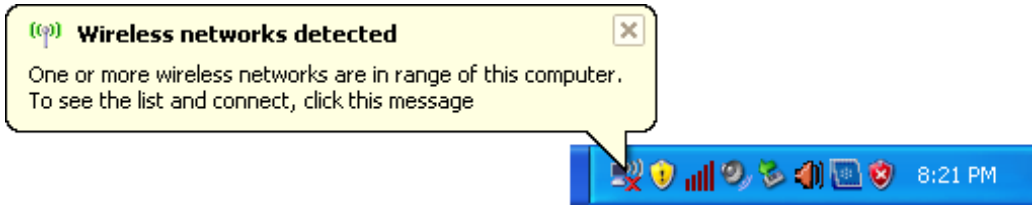
Step 1. Attach the power connector

Plug the 802.11n WiFi Repeater into a power socket.

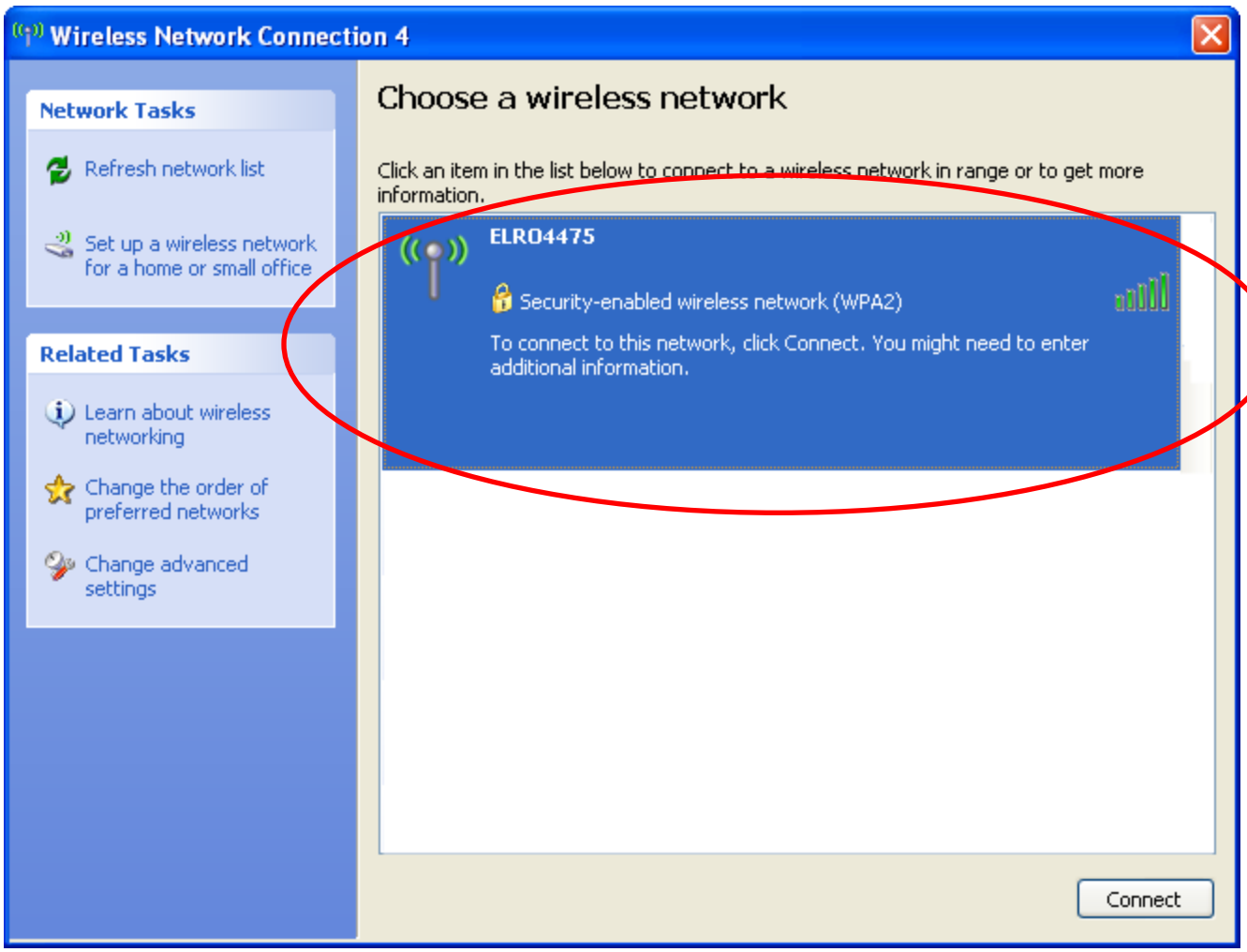
5 Utility CD execution

Wireless Connection

1. Double click on the wireless icon on your computer and search for the wireless network that you enter **SSID** name.


Wireless networks detected
One or more wireless networks are in range of this computer.
To see the list and connect, click this message
8:21 PM

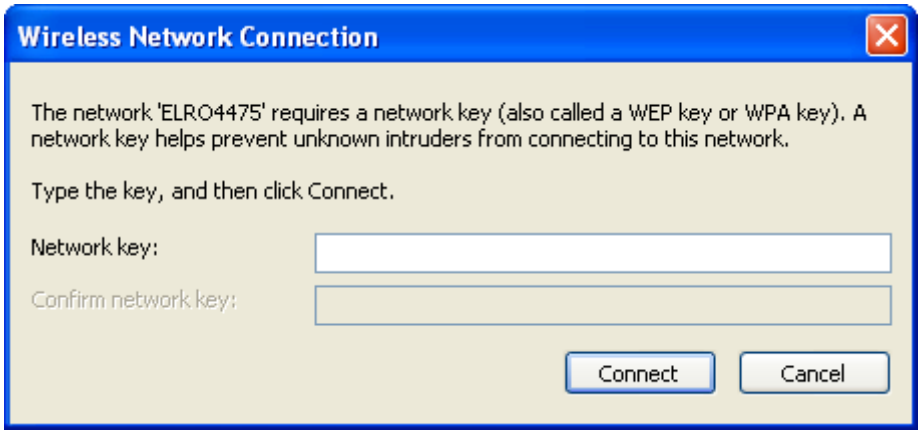
2. Click on the wireless network that you enter **SSID** name **(the default setting SSID = ELROxxxx, xxxx = last 4 digits of WLAN MAC Address which could be found from the device sticker)** to connect.


Wireless Network Connection 4
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
ELRO4475
Security-enabled wireless network (WPA2)
To connect to this network, click Connect. You might need to enter additional information.
Connect

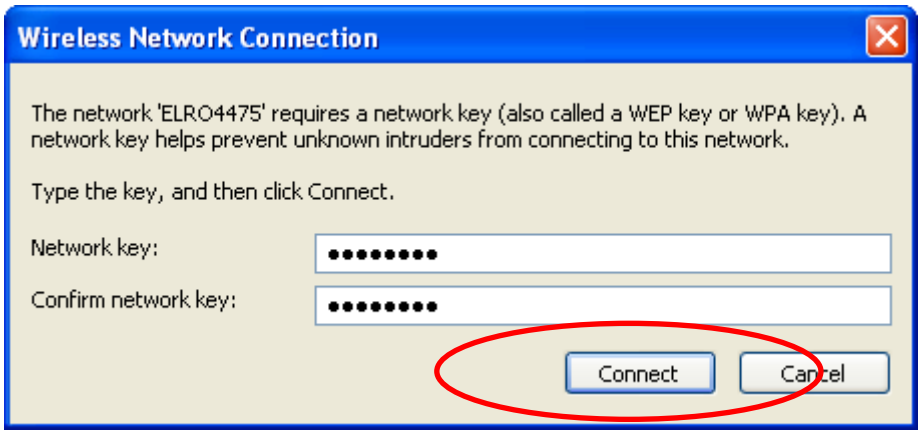
3. If the wireless network isn't encrypted, click on "**Connect Anyway**" to connect.

Wireless Network Connection
You are connecting to the unsecured network "ELRO4475". Information sent over this network is not encrypted and might be visible to other people.
Connect Anyway
Cancel

4. If the wireless network is encrypted, enter the network key that belongs to your authentication type and key **(the default settings Security Mode = WPA2 Mixed, Passphrase = last 8 digits of WLAN MAC Address which could be found from the device sticker)**.


Wireless Network Connection
The network 'ELRO4475' requires a network key (also called a WEP key or WPA key). A network key helps prevent unknown intruders from connecting to this network.
Type the key, and then click Connect.
Network key:
Confirm network key:
Connect
Cancel

5. Click on "Connect" or "Apply".

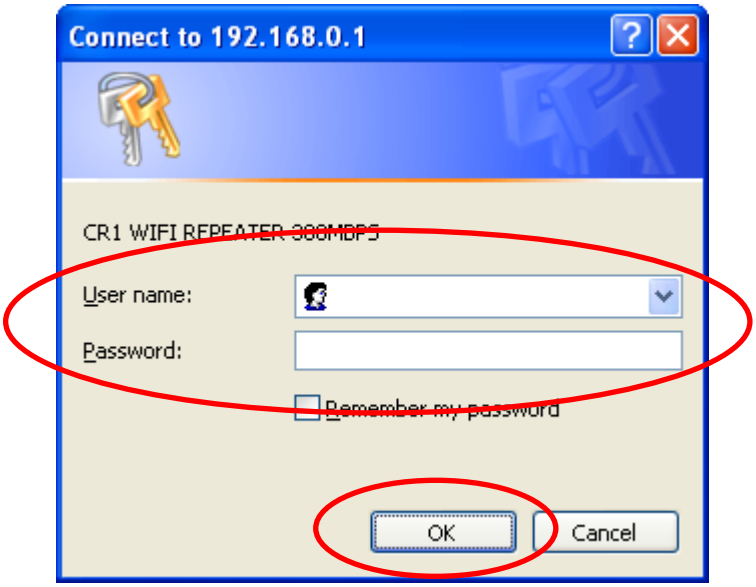

Wireless Network Connection
The network 'ELRO4475' requires a network key (also called a WEP key or WPA key). A network key helps prevent unknown intruders from connecting to this network.
Type the key, and then click Connect.
Network key:
Confirm network key:
Connect
Cancel

6. Now you are ready to use the Wireless Network to Internet or intranet.

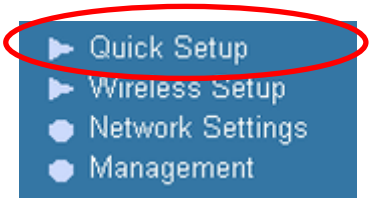
Advanced Configuration with Router Mode

7. Please insert the supplied CD into your CD-ROM drive.
8. The CD should auto-start, displaying the window shown in 3. below. If your CD does not start automatically, go to Windows Explorer, Select your CD drive and double click "**autorun.exe**".
9. To configure the device, please click "**Advanced Configuration**".
10. Alternative way is to launch your web browser, type **http://192.168.0.1** in the web address (or location) box, and press [Enter] on your keyboard.

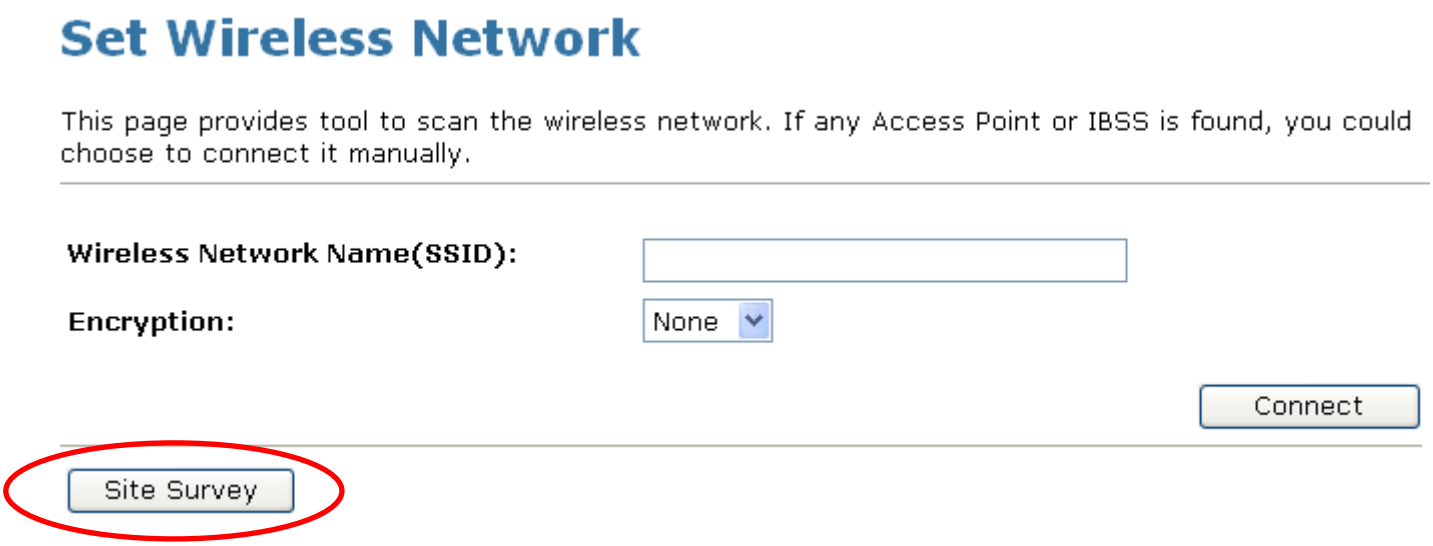
11. Please enter the Login User Name: **admin** and Login Password: **admin** and then click on **OK** button.



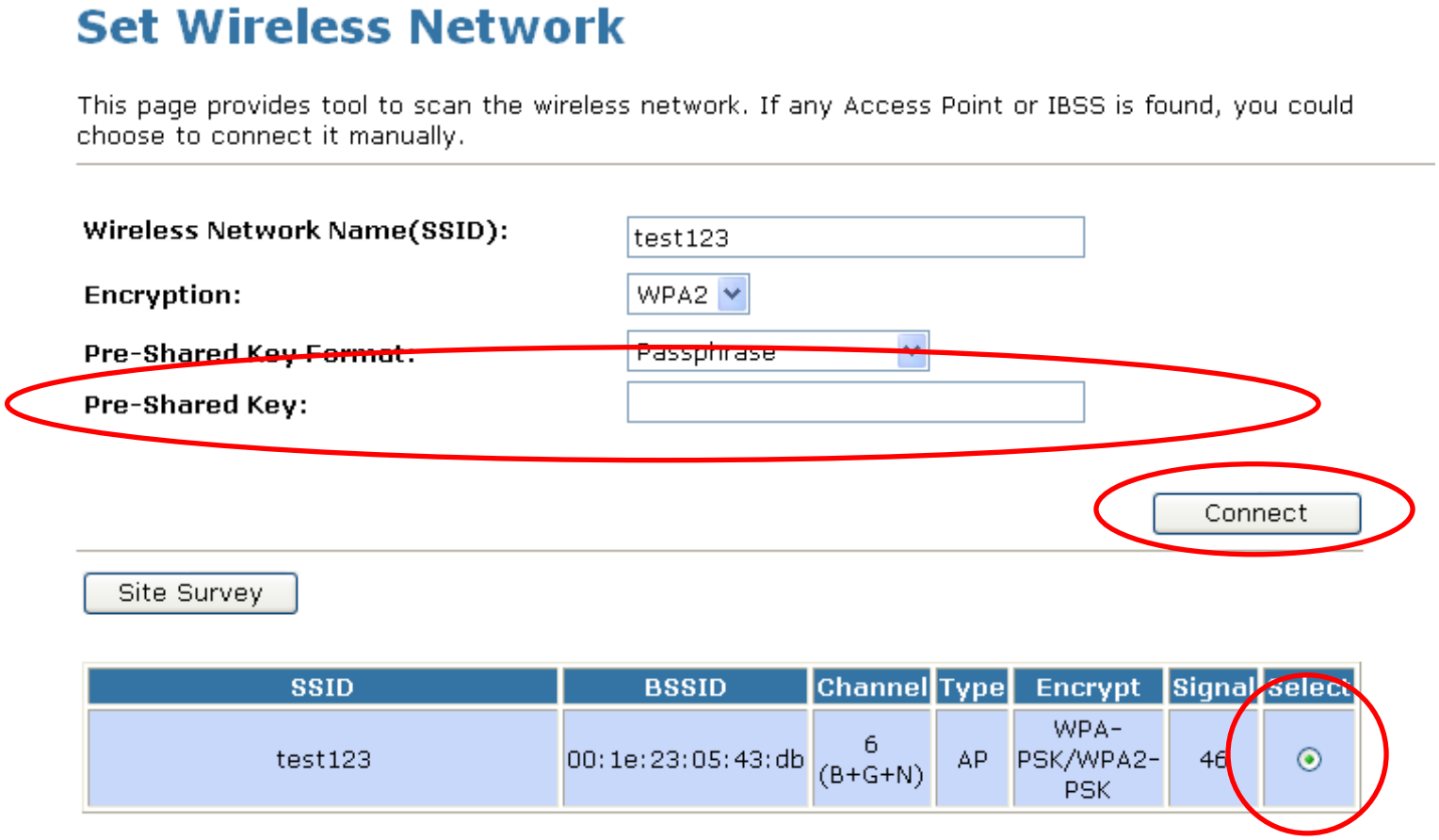
12. Click on **Quick Setup** menu.



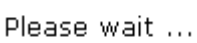
13. Click on ***Site Survey*** button.


Set Wireless Network
This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually.
Wireless Network Name(SSID):
Encryption:
None
Connect
Site Survey

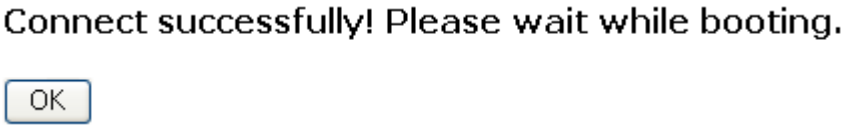
14. Now you could see the APs that scanned by the WiFi Repeater were listed below.
15. Click on the ratio of AP's SSID under the item ***Select*** that you want the WiFi Repeater to connect to.
16. Enter the related parameters.
17. Click ***Connect*** button.



18. Please wait...



19. Connect successfully! Please wait 2 minutes while booting.



20. If the WPS LED is on, the 802.11n WiFi Repeater has been configured completely, and suitable for Wireless and Internet Connections.
21. If the WPS LED isn't on, reset the device to factory by pressing reset button for 6 full seconds and configure again.

6 Getting Started with the Web pages

The device includes a series of Web pages that provide an interface to the software installed on the device. It enables you to configure the device settings to meet the needs of your network. You can access it through your web browser from any PC connected to the device via the WLAN.

Accessing the Web pages

To access the Web pages, you need the following:

- A PC or laptop connected to the Wireless Interface of the device.
- A web browser installed on the PC. The minimum browser version requirement is Internet Explorer v4 or Netscape v4. For the best display quality, use latest version of Internet Explorer, Netscape or Mozilla Fire fox. From any of the LAN computers, launch your web browser, type the following URL in the web address (or location) box, and press [Enter] on your keyboard:

  http://192.168.0.1

  The Status homepage for the web pages is displayed:

Access Point Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:0m:55s
Firmware Version	v3.2.1
Customer Version	REBN_v3.2.1_2T2R_ELR_01_131112
Build Time	Tue Nov 12 03:22:20 EST 2013
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	ELRO4475
Channel Number	1
Encryption	WPA2 Mixed
BSSID	00:13:33:55:44:75
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DHCP Server	Enabled
MAC Address	00:13:33:55:44:73
WAN Configuration	
Attain IP Protocol	Getting IP from DHCP server...
IP Address	0.0.0.0
Subnet Mask	0.0.0.0
Default Gateway	0.0.0.0
MAC Address	00:13:33:55:44:74

Figure 2: Homepage

The first time that you click on an entry from the left-hand menu, a login box is displayed. You must enter your username and password to access the pages.

A login screen is displayed:

Figure 3: Login screen

1. Enter your user name and password. The first time you log into the program, use these defaults:

User Name:	**admin**
Password:	**admin**

Note

You can change the password at any time or you can configure your device so that you do not need to enter a password. See Password.

2. Click on OK. You are now ready to configure your device.

This is the first page displayed each time you log in to the Web pages.

Note

If you receive an error message or the Welcome page is not displayed, see Troubleshooting Suggestions.

Testing your Setup

Once you have connected your hardware and configured your PCs, any computer on your WLAN should be able to use the DSL /Cable connection to access the Internet.

To test the connection, turn on the device, wait for 30 seconds and then verify that the LEDs are illuminated as follows:

Table 1. LED Indicators

Label	Color	Function
POWER	green	On: device is powered on Off: device is powered off
WLAN	green	On: WLAN link established and active Blink: Valid Wireless packet being transferred
WPS	green	Off: WPS link isn't established and active Blink: Valid WPS packet being transferred

If the LEDs illuminate as expected, test your Internet connection from a LAN computer. To do this, open your web browser, and type the URL of any external website (such as *http://www.yahoo.com*). The LED labeled *WPS* should appear solid as the device connects to the front AP.

Default device settings

In addition to handling the xDSL / Cable modem connection to your ISP, the device can provide a variety of services to your

network. The device is preconfigured with default settings for use with a typical home or small office network.

The table below lists some of the most important default settings; these and other features are described fully in the subsequent chapters. If you are familiar with network configuration, review these settings to verify that they meet the needs of your network. Follow the instructions to change them if necessary. If you are unfamiliar with these settings, try using the device without modification, or contact your ISP for assistance.

WARNING

We strongly recommend that you contact your ISP prior to changing the default configuration.

Option	Default Setting	Explanation/Instructions
WAN Port IP Address	DHCP Client	This is the temporary public IP address of the WAN port on the device. It is an unnumbered interface that is replaced as soon as your ISP assigns a 'real' IP address. See *Network Settings -> WAN Interface*.
LAN Port IP Address	Assigned static IP address: 192.168.0.1 Subnet mask: 255.255.255.0	This is the IP address of the LAN port on the device. The LAN port connects the device to your Ethernet network. Typically, you will not need to change this address. See *Network Settings -> LAN Interface*.
DHCP (Dynamic Host Configuration Protocol)	DHCP server enabled with the following pool of addresses: 192.168.0.100 through 192.168.0.200	The device maintains a pool of private IP addresses for dynamic assignment to your LAN computers. To use this service, you must have set up your computers to accept IP information dynamically, as described in *Configuring Ethernet PCs*.

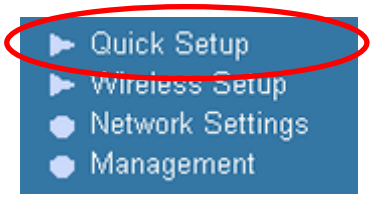
7 Quick Setup (This function may vary depending on Router, Client or WiFi-AP mode)

The *Quick Setup* page displays useful information about the setup of your device, including:

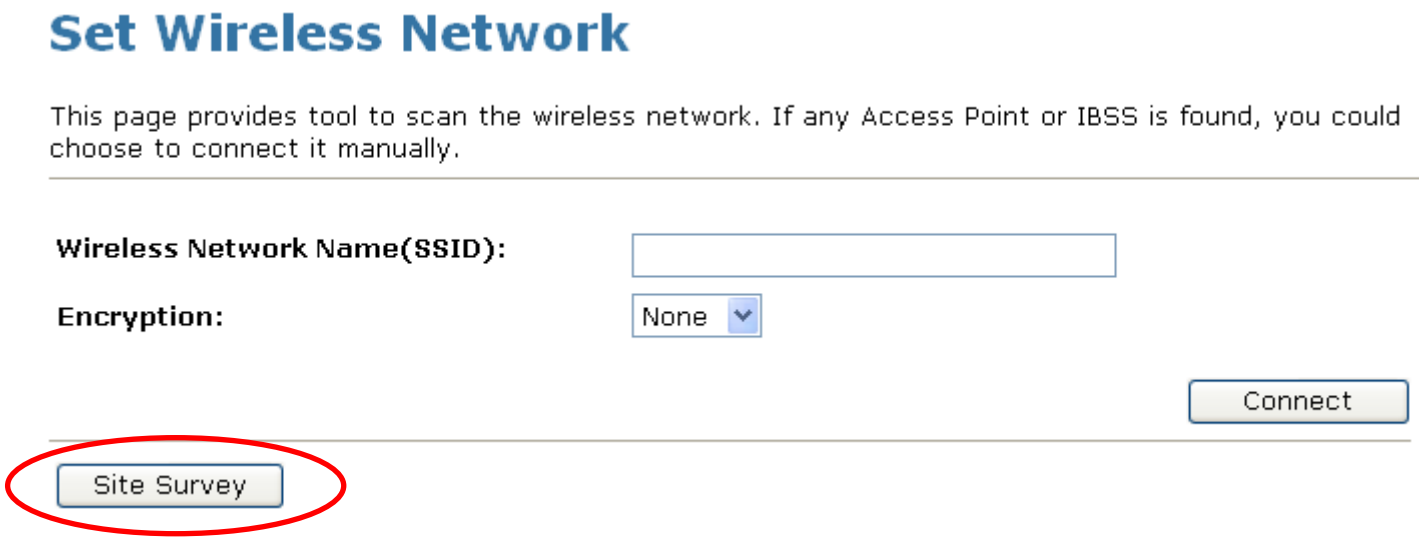
- details of the device's Wireless settings

To display this page:

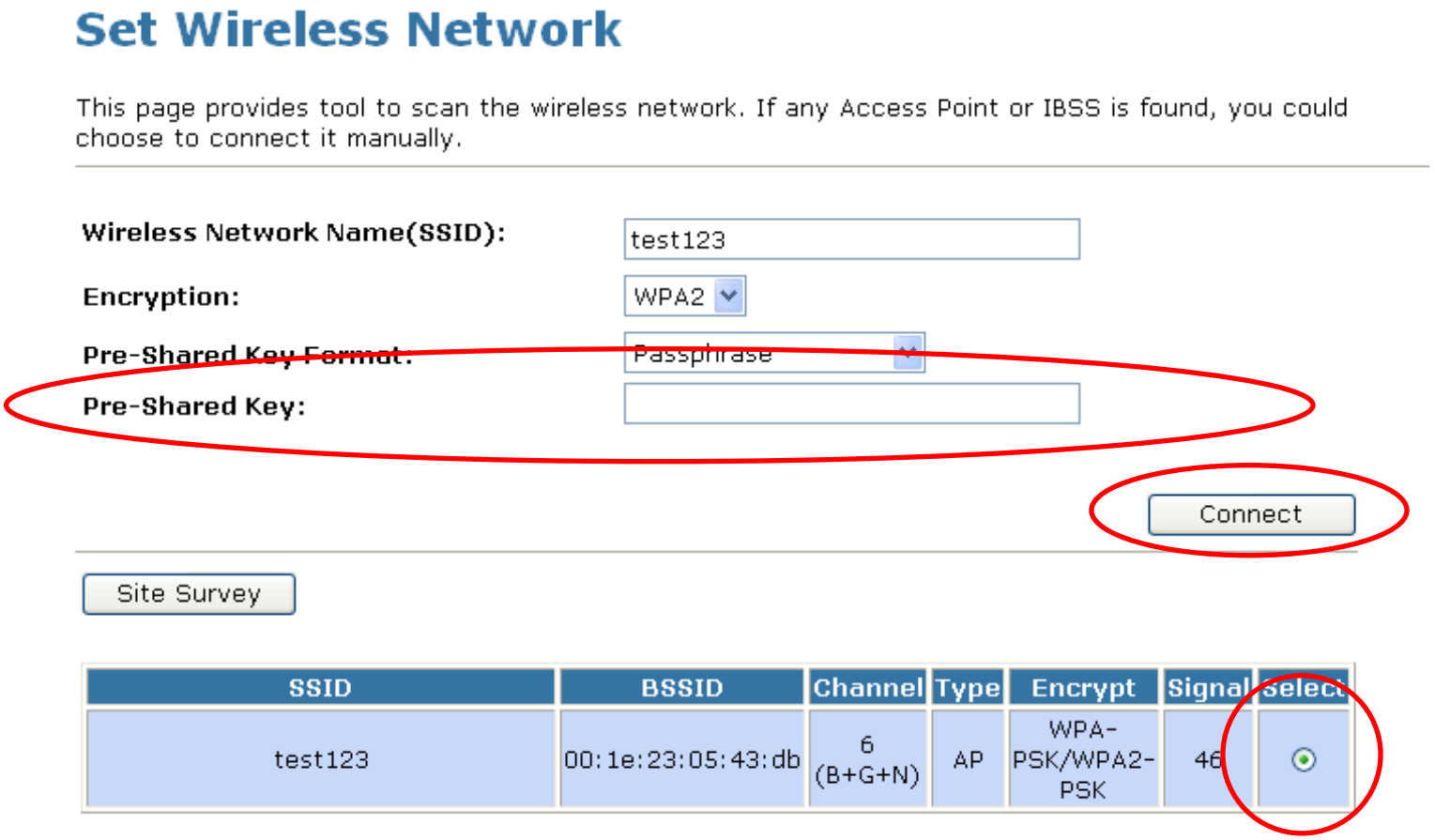
1. From the left-hand menu, click on *Quick Setup*. The following page is displayed:



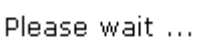
2. Click on ***Site Survey*** button.


Set Wireless Network
This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually.
Wireless Network Name(SSID):
Encryption:
None
Connect
Site Survey

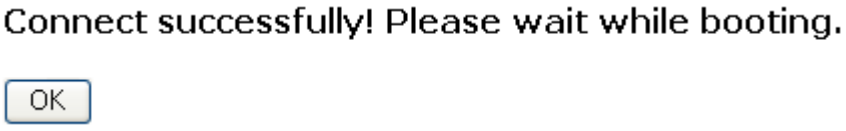
3. Now you could see the APs that scanned by the WiFi Repeater were listed below.
4. Click on the ratio of AP's SSID under the item ***Select*** that you want the WiFi Repeater to connect to.
5. Enter the related parameters.
6. Click ***Connect*** button.



7. Please wait...



8. Connect successfully! Please wait while booting.



9. If the WPS LED is on, the 802.11n WiFi Repeater has been configured completely, and suitable for Wireless and Internet Connections.
10. If the WPS LED isn't on, reset the device to factory by pressing reset button for 6 full seconds and configure again.

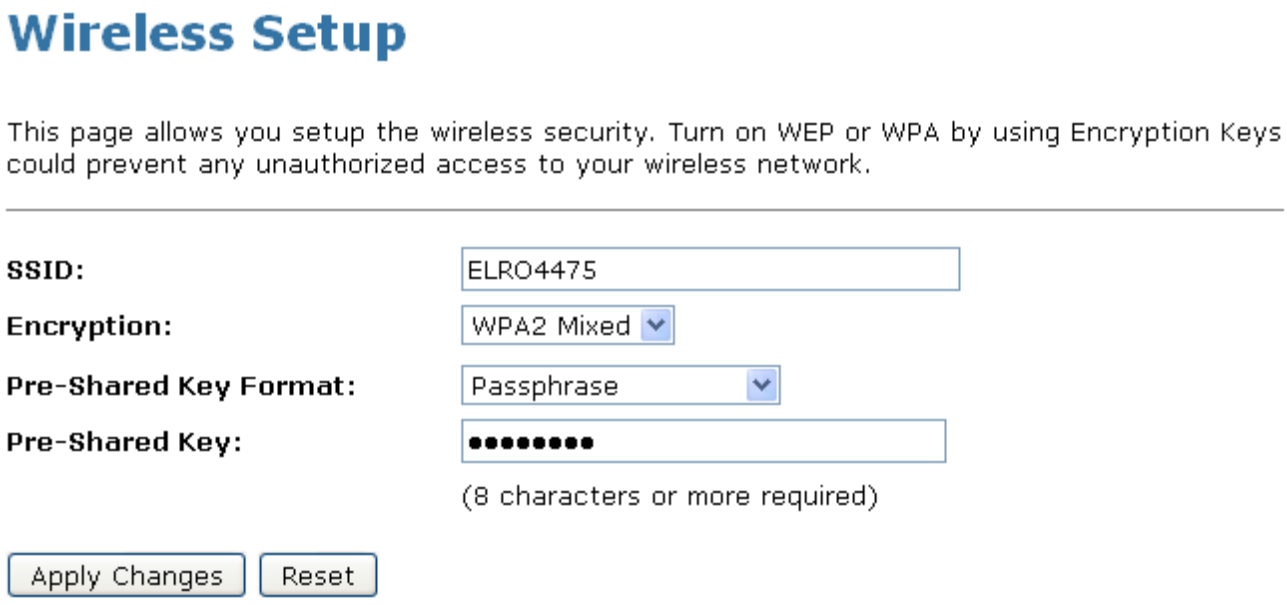
8 Wireless Setup

This chapter assumes that you have already set up your Wireless PCs and installed a compatible Wireless card on your device. See *Configuring Wireless PCs*.

Wireless Setup

The *Wireless Network* page allows you to configure the Wireless features of your device. To access the *Wireless Setup* page:

From the left-hand *Wireless Setup* menu. The following page is displayed:



Field	Description
SSID	**Specify the network name.** **Each Wireless LAN network uses a unique Network Name to identify the network. This name is called the Service Set Identifier (SSID). When you set up your wireless adapter, you specify the SSID. If you want to connect to an existing network, you must use the name for that network. If you are setting up your own network you can make up your own name and use it on each computer. The name can be up to 20 characters long and contain letters and numbers.**
Encryption	**Configure the Encryption to Disable, WEP, WPA(AES) , WPA2(AES) or WPA-Mixed**
Key Length	**Select the Key Length 64-bit or 128-bit**
Key Format	**Select the Key Format ASCII (5 characters), Hex (10 characters), ASCII (13 characters) or Hex (26 characters)**
Encryption Setting	**Enter the Encryption Key**
Pre-Shared Key Format	**Configure the Pre-Shared Key Format to Passphrase or HEX (64 characters)**
Pre-Shared Key	**Type the Pre-Shared Key**

9 LAN Interface

This chapter is to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP address, subnet mask, DHCP, etc...

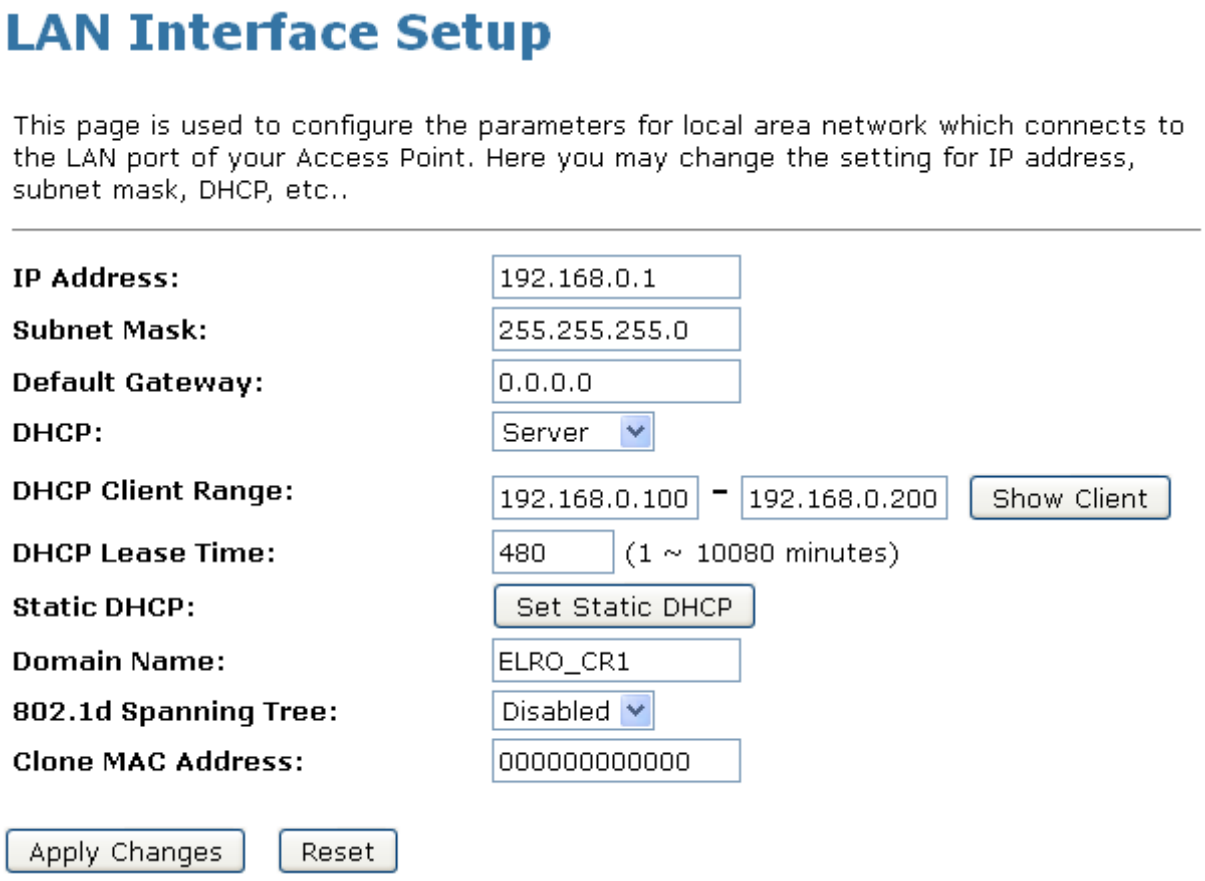
Note

You should only change the addressing details if your ISP asks you to, or if you are familiar with network configuration. In most cases, you will not need to make any changes to this configuration.

LAN Interface Setup

To check the configuration of LAN Interface:

1. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:

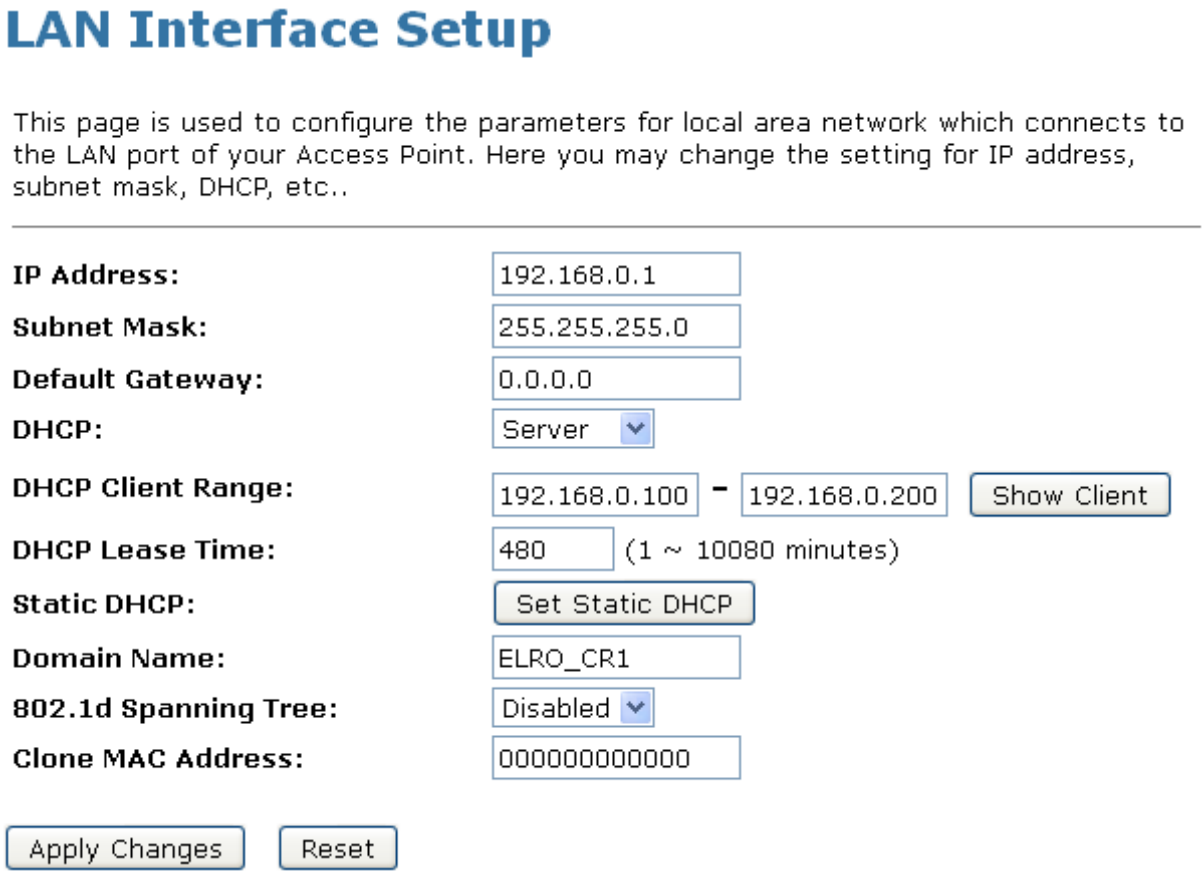


Field	Description
IP Address	**The LAN IP address** **Default: 192.168.0.1**
Subnet Mask	**The LAN netmask** **Default: 255.255.255.0**
Default Gateway	**The LAN Gateway** **Default: 0.0.0.0**
DHCP	**DHCP Type: Disable, DHCP Client or Server** **Default: DHCP Server**
DHCP Client Range	**Specify the starting/ending IP address of the IP address pool.** **Default Start IP: 192.168.0.100** **Default Ending IP: 192.168.0.200**
Show Client	**DHCP client computers/devices connected to the device will have their information displayed in the DHCP Client List table. The table will show the IP Address, MAC Address, and Expired Time of the DHCP lease for each client computer/device.**
Domain Name	**A domain name is a user-friendly name used in place of its associated IP address. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site.**
802.1d Spanning Tree	**Enable or Disable Spanning Tree**
Clone MAC Address	**MAC Spoofing on LAN** **Default: 000000000000**

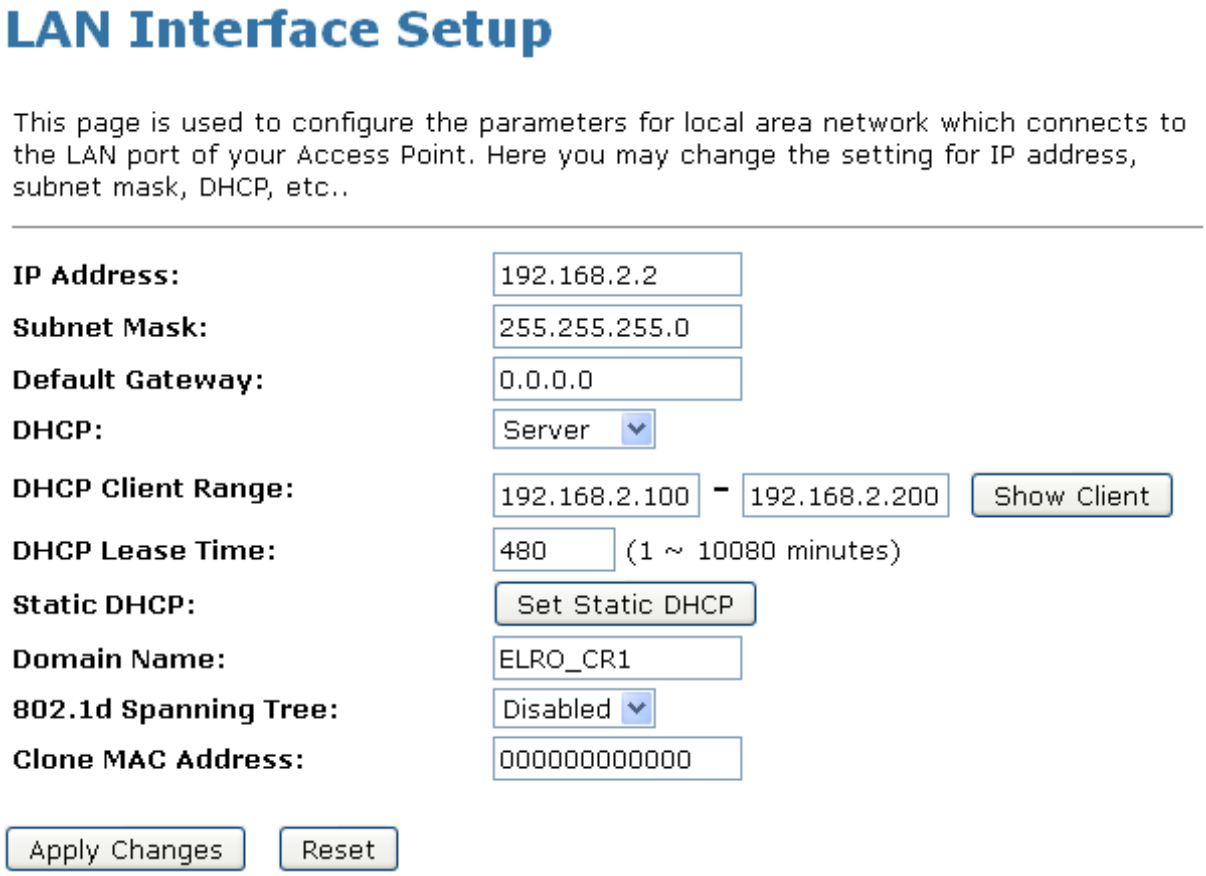
Changing the LAN IP address and subnet mask

To check the configuration of LAN Interface:

2. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:



3. Type IP Address and *Change default LAN port IP address*.
4. Click in the *IP Address and Subnet Mask* box and type a new IP Address and Subnet Mask.
5. Change the *default DHCP Client Range*.
6. Click *Apply Changes*.



7. Change setting successfully! Please wait 20 seconds….

You may also need to renew your DHCP lease:

Windows 95/98

a. Select **Run...** from the **Start** menu.

b. Enter **winipcfg** and click **OK**.

c. Select your ethernet adaptor from the pull-down menu

d. Click **Release All** and then **Renew All**.

e. **Exit** the winipcfg dialog.

Windows NT/Windows 2000/Windows XP

a. Bring up a command window.

b. Type **ipconfig /release** in the command window.

c. Type **ipconfig /renew**.

d. Type **exit** to close the command window.

Linux

a. Bring up a shell.

b. Type **pump -r** to release the lease.

c. Type **pump** to renew the lease.

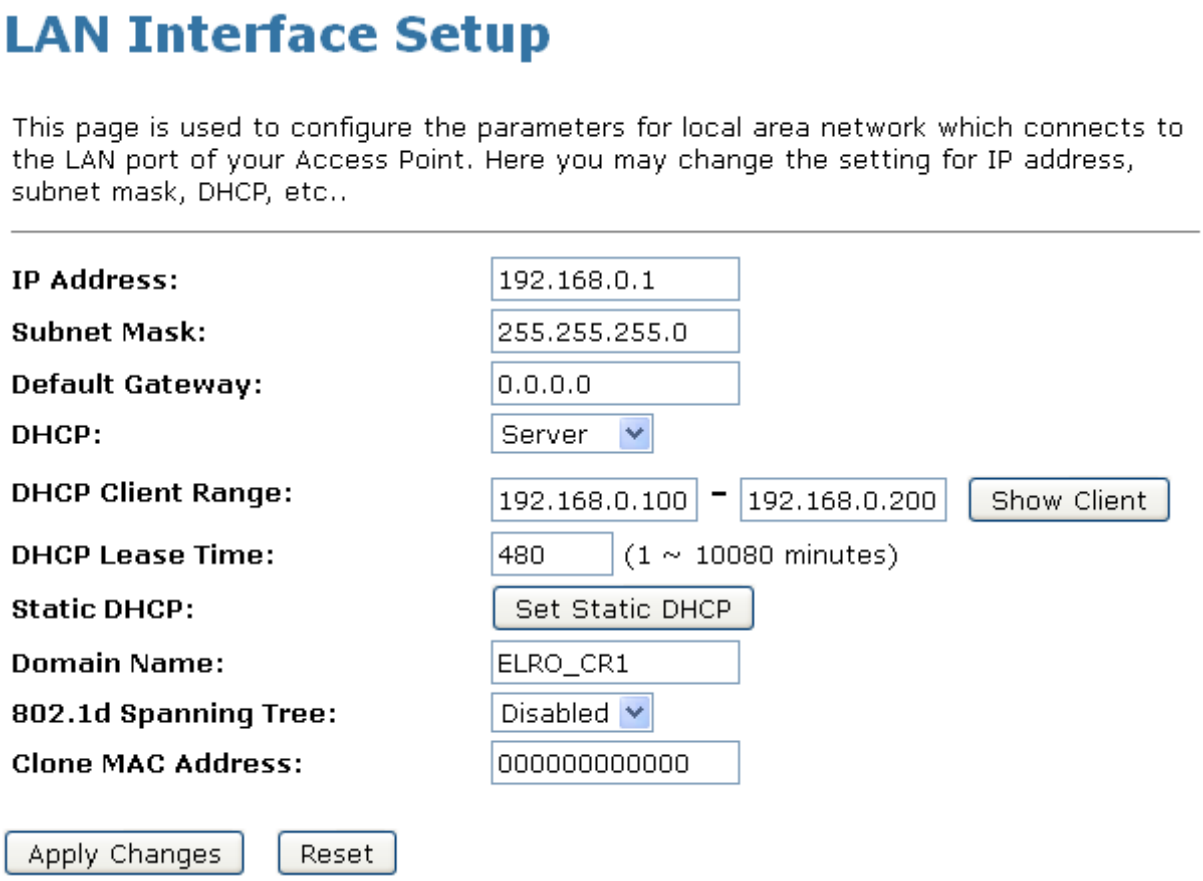
Note

If you change the LAN IP address of the device while connected through your Web browser, you will be disconnected. You must open a new connection by entering your new LAN IP address as the URL.

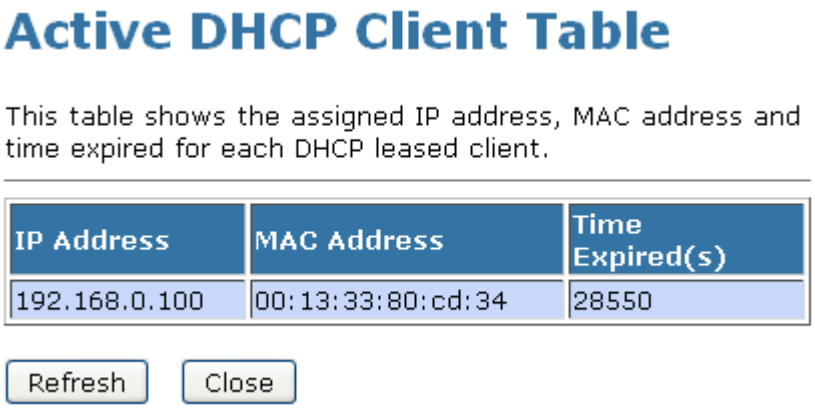
Show Client

To the IP Address, MAC Address, and Expired Time of the DHCP lease for each client computer/device:

1. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:



2. Click on *Show Client* button. The following page is displayed:



10 Status

This page displays the current information for the device. It will display the LAN, WAN, and system firmware information. This page will display different information, according to WAN setting.

1. From the left-hand *Management -> Status* menu. The following page is displayed:

Access Point Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:0m:55s
Firmware Version	v3.2.1
Customer Version	REBN_v3.2.1_2T2R_ELR_01_131112
Build Time	Tue Nov 12 03:22:20 EST 2013
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	ELRO4475
Channel Number	1
Encryption	WPA2 Mixed
BSSID	00:13:33:55:44:75
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DHCP Server	Enabled
MAC Address	00:13:33:55:44:73
WAN Configuration	
Attain IP Protocol	Getting IP from DHCP server...
IP Address	0.0.0.0
Subnet Mask	0.0.0.0
Default Gateway	0.0.0.0
MAC Address	00:13:33:55:44:74

11 Firmware Update

About firmware versions

Firmware is a software program. It is stored as read-only memory on your device.

Your device can check whether there are later firmware versions available. If there is a later version, you can download it via the Internet and install it on your device.

Note

If there is a firmware update available you are strongly advised to install it on your device to ensure that you take full advantage of any new feature developments.

Manually updating firmware

You can manually download the latest firmware version from provider's website to your PC's file directory.

Once you have downloaded the latest firmware version to your PC, you can manually select and install it as follows:

1. From the left-hand *Management* menu, click on *Upgrade Firmware Upgrade*. The following page is displayed:
2. Click on the *Browse…* button.

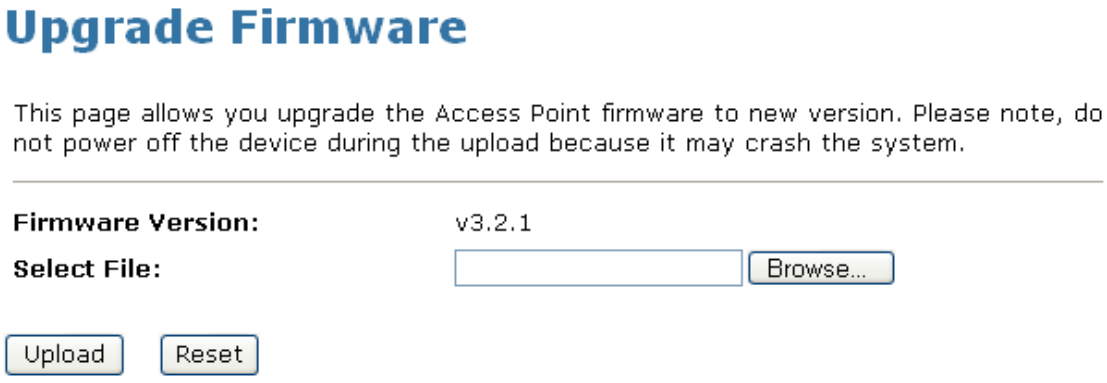

Upgrade Firmware
This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system.
Firmware Version:
v3.2.1
Select File:
Browse...
Upload
Reset

Figure 4: Manual Update Installation section

(Note that if you are using certain browsers (such as *Opera 7*) the *Browse* button is labeled *Choose*.)

Use the *Choose file* box to navigate to the relevant directory where the firmware version is saved.

3. Once you have selected the file to be installed, click *Open*. The file's directory path is displayed in the *New Firmware Image:* text box.
4. Click *Upload*. The device checks that the selected file contains an updated version of firmware. A status screen pops up, please wait for a while…….

5. Firmware update has been update complete. The following page is displayed:

Change setting successfully!

Do not turn off or reboot the Device during this time.

Please wait 85 seconds ...

12 Save/Reload Settings

This page allows you save current settings to a file or reload the settings from the file which was saved previously.

Besides, you could reset the current configuration to factory default.

If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

Save Settings to File

It allows you save current settings to a file.

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

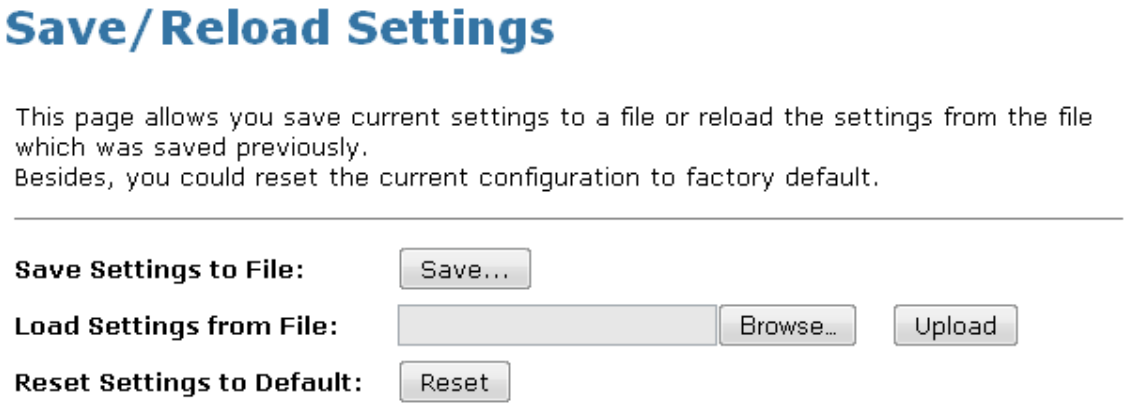
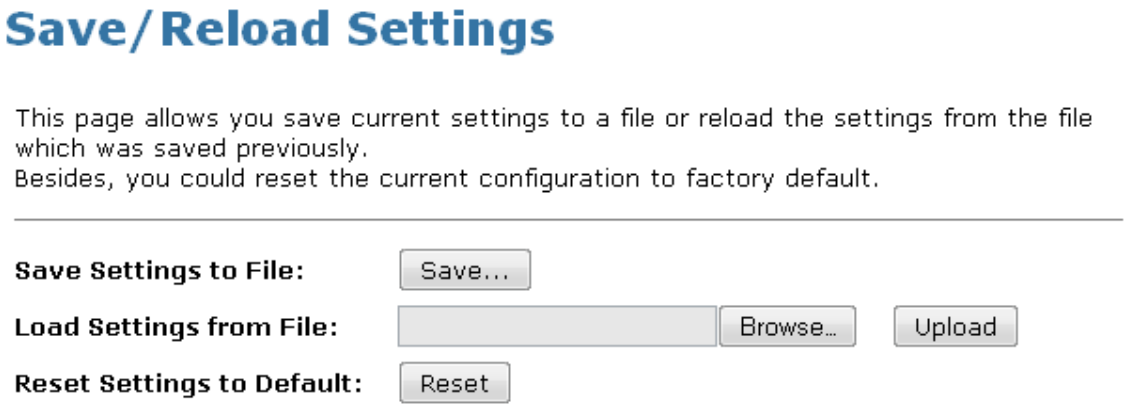

Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

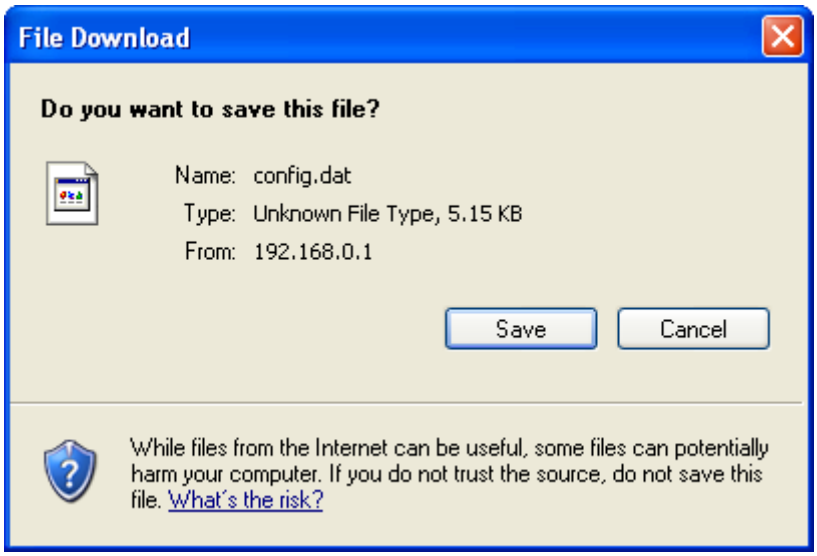
Figure 5: Reset to Defaults page

Option	Description
Save Settings to File	**Save the Settings to a File**
Load Settings from File	**Load Settings from a File**
Reset Settings to Default	**Reset Settings to Factory Default**

2. Click on *Save*….


Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

3. If you are happy with this, click *Save* and then browse to where the file to be saved. Or click *Cancel* to cancel it.


File Download
Do you want to save this file?
Name: config.dat
Type: Unknown File Type, 5.15 KB
From: 192.168.0.1
Save
Cancel
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not save this file. What's the risk?

Load Settings from File

It allows you to reload the settings from the file which was saved previously.

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

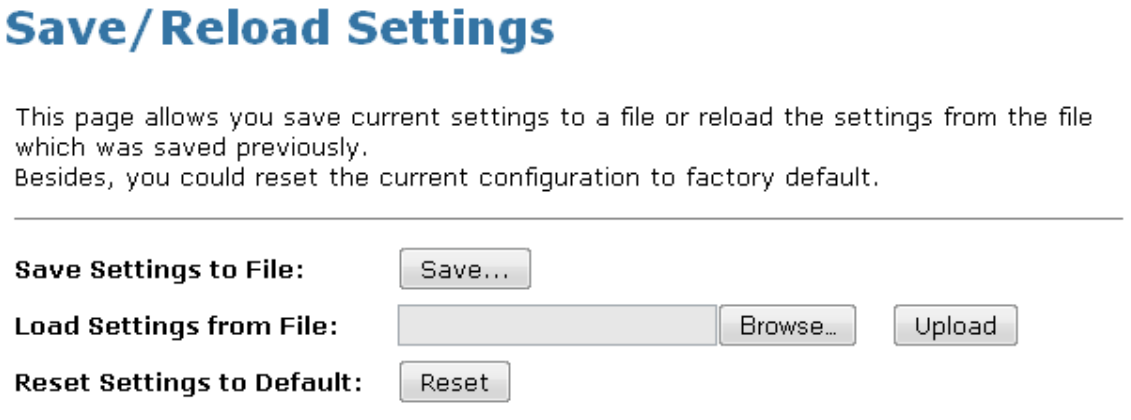
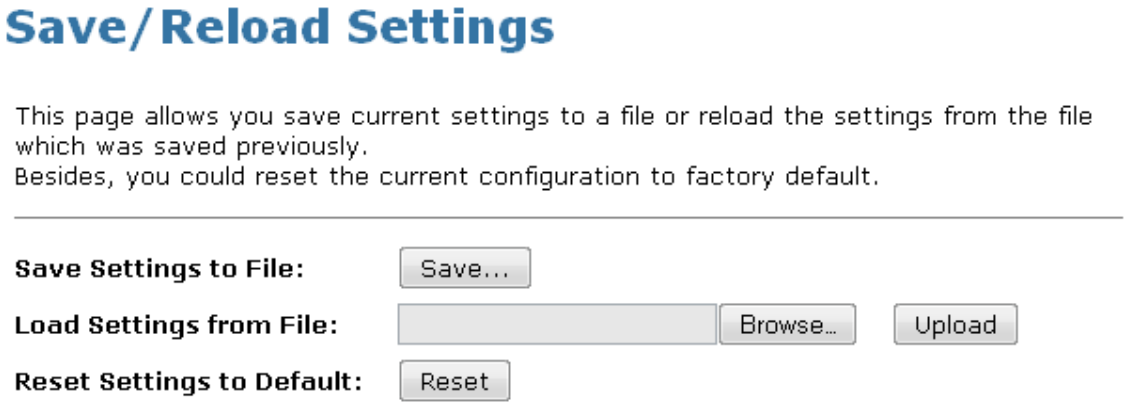
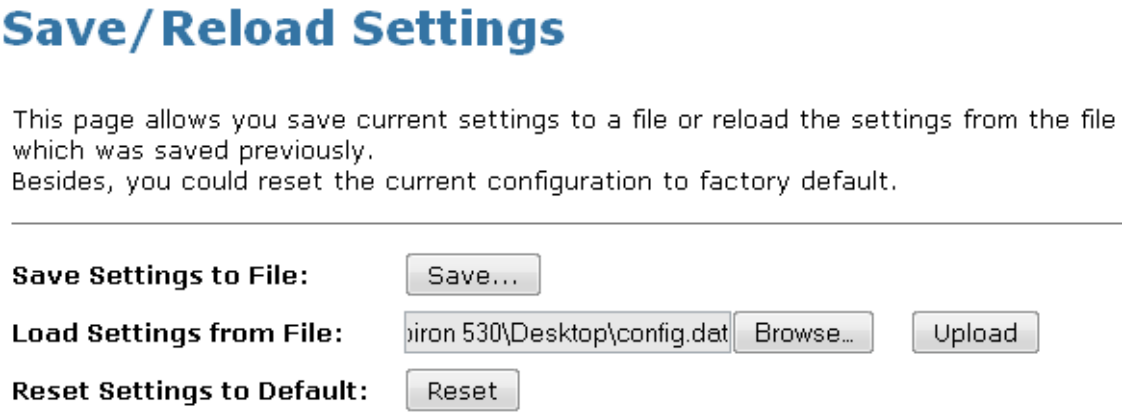

Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

Figure 6: Reset to Defaults page

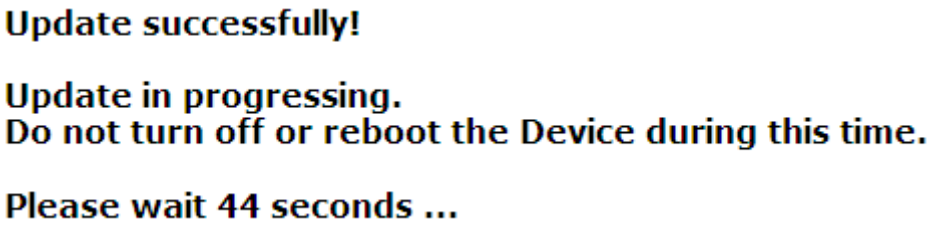
2. Click on *Browse*….to browse to where the config.dat is.


Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

3. If you are happy with this, click *Upload* to start to load settings from file.


Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
iron 530\Desktop\config.dat
Browse...
Upload
Reset Settings to Default:
Reset

4. Once it finished loading settings form file, it'll show the message below.



Resetting to Defaults

If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

Note

If you reset your device to factory defaults, all previous configuration changes that you have made are overwritten by the factory default configuration.

Software Reset:

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

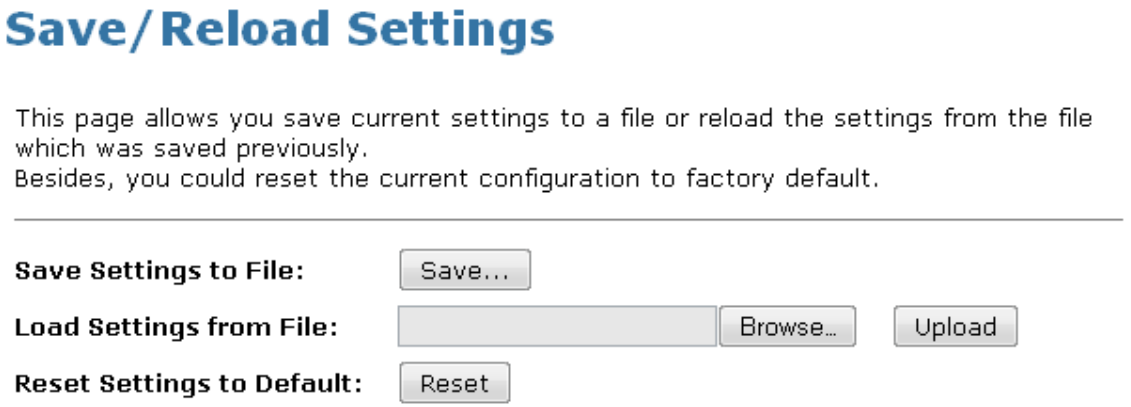
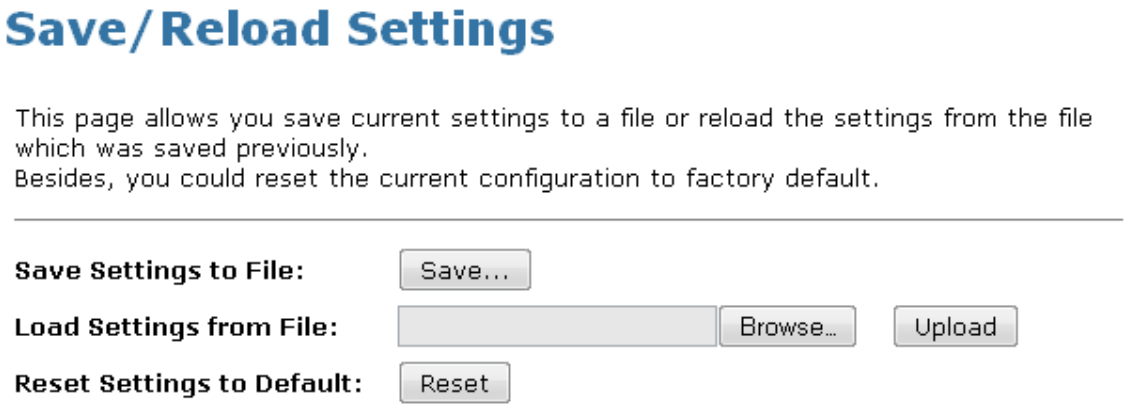
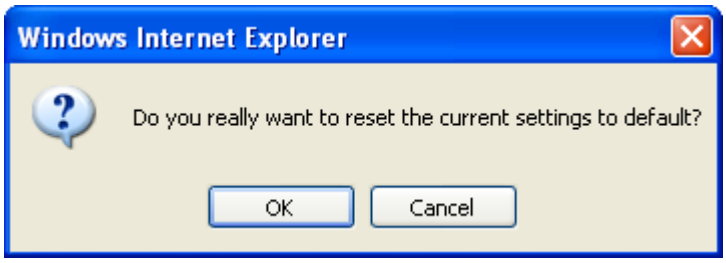

Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

Figure 7: Reset to Defaults page

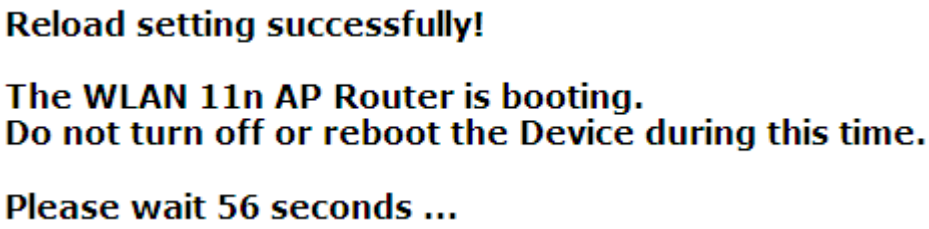
2. Click on *Reset Settings to Default*.


Save/Reload Settings
This page allows you save current settings to a file or reload the settings from the file which was saved previously.
Besides, you could reset the current configuration to factory default.
Save Settings to File:
Save...
Load Settings from File:
Browse...
Upload
Reset Settings to Default:
Reset

3. This page reminds you that resetting to factory defaults cannot be undone – any changes that you have made to the basic settings will be replaced. If you are happy with this, click *OK*. Or click *Cancel* to cancel it.



4. Reload setting successfully! Please wait for a moment while rebooting ...


Reload setting successfully!
The WLAN 11n AP Router is booting.
Do not turn off or reboot the Device during this time.
Please wait 56 seconds ...

5. Once it finished resetting to factory, it'll show the Status page.

Access Point Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:0m:55s
Firmware Version	v3.2.1
Customer Version	REBN_v3.2.1_2T2R_ELR_01_131112
Build Time	Tue Nov 12 03:22:20 EST 2013
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	ELRO4475
Channel Number	1
Encryption	WPA2 Mixed
BSSID	00:13:33:55:44:75
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DHCP Server	Enabled
MAC Address	00:13:33:55:44:73
WAN Configuration	
Attain IP Protocol	Getting IP from DHCP server...
IP Address	0.0.0.0
Subnet Mask	0.0.0.0
Default Gateway	0.0.0.0
MAC Address	00:13:33:55:44:74

13 Password

You can restrict access to your device's web pages using password protection. With password protection enabled, users must enter a username and password before gaining access to the web pages.

By default, password protection is enabled on your device, and the username and password set are as follows:

Username: **admin**

Password: **admin**

Setting your username and password

Note

Non-authorized users may try to access your system by guessing your username and password. We recommend that you change the default username and password to your own unique settings.

To change the default password:

1. From the left-hand *Management* menu, click on *Password*. The following page is displayed:

Password Setup
This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.
User Name:
New Password:
Confirmed Password:
Apply Changes
Reset

Figure 8: Currently Defined Administration Password: Setup page

2. This page displays the current username and password settings. Change your own unique password in the relevant boxes. They can be any combination of letters or numbers with a maximum of 30 characters. The default setting uses ***admin*** for the username and **admin** for password.
3. If you are happy with these settings, click ***Apply***. You will see following page that the new user has been displayed on the Currently Defined Users. You need to login to the web pages using your new username and new password.

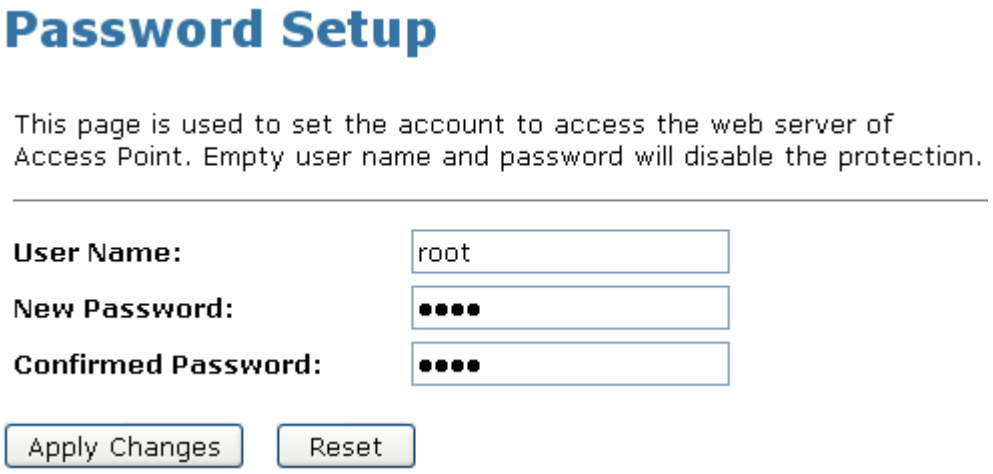
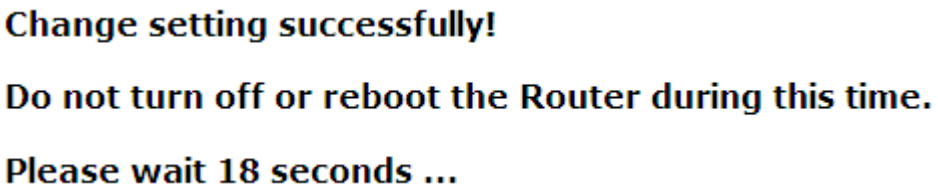

Password Setup
This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.
User Name:
root
New Password:
Confirmed Password:
Apply Changes
Reset

Figure 9: Administration Password

4. Change setting successfully.



5. Enter new *User name* and *Password*.
6. Click *Apply.*

Figure 10: Login page

A Configuring your Computers

This appendix provides instructions for configuring the Internet settings on your computers to work with the device.

Configuring Ethernet PCs

Before you begin

By default, the device automatically assigns the required Internet settings to your PCs. You need to configure the PCs to accept this information when it is assigned.

Note

In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the device to do so. See *Assigning static Internet information to your PCs* for instructions.

- If you have connected your LAN PCs via Ethernet to the device, follow the instructions that correspond to the operating system installed on your PC:
  - Windows® XP PCs
  - Windows 2000 PCs
  - Windows Me PCs
  - Windows 95, 98 PCs
  - Windows NT 4.0 workstations

Windows® XP PCs

1. In the Windows task bar, click the *Start* button, and then click *Control Panel*.
2. Double-click the Network Connections icon.
3. In the *LAN or High-Speed Internet* window, right-click on the icon corresponding to your network interface card (NIC) and select *Properties*. (Often, this icon is labeled *Local Area Connection*).

   The *Local Area Connection* dialog box is displayed with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled *Internet Protocol TCP/IP* is checked and click *Properties*.
5. In the *Internet Protocol (TCP/IP) Properties* dialog box, click the radio button labeled *Obtain an IP address automatically*. Also click the radio button labeled *Obtain DNS server address automatically*.
6. Click *OK* twice to confirm your changes, and then close the Control Panel.

Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network and Dial-up Connections icon.

3. In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*.

   The *Local Area Connection Properties* dialog box is displayed with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.

4. If Internet Protocol (TCP/IP) does not display as an installed component, click *Install…*
5. In the *Select Network Component* Type dialog box, select *Protocol*, and then click *Add…*
6. Select *Internet Protocol (TCP/IP)* in the Network Protocols list, and then click *OK*.

   You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.

7. If prompted, click *OK* to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the device:

8. In the *Control Panel*, double-click the Network and Dial-up Connections icon.
9. In the *Network and Dial-up Connections* window, right-click the Local Area Connection icon, and then select *Properties*.
10. In the Local Area Connection Properties dialog box, select *Internet Protocol (TCP/IP),* and then click *Properties*.
11. In the *Internet Protocol (TCP/IP) Properties* dialog box, click the radio button labeled *Obtain an IP address automatically.* Also click the radio button labeled *Obtain DNS server address automatically*.
12. Click *OK* twice to confirm and save your changes, and then close the Control Panel.

Windows Me PCs

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network and Dial-up Connections icon.
3. In the *Network and Dial-up Connections* window, right-click the Network icon, and then select *Properties*.

   The *Network Properties* dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 11.
4. If Internet Protocol (TCP/IP) does not display as an installed component, click *Add…*
5. In the *Select Network Component Type* dialog box, select *Protocol*, and then click *Add…*
6. Select *Microsoft* in the Manufacturers box.
7. Select *Internet Protocol (TCP/IP)* in the Network Protocols list, and then click *OK*.

   You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.
8. If prompted, click *OK* to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the device:

9. In the *Control Panel*, double-click the Network and Dial-up Connections icon.
10. In *Network and Dial-up Connections window*, right-click the Network icon, and then select *Properties*.
11. In the *Network Properties* dialog box, select *TCP/IP*, and then click *Properties*.
12. In the TCP/IP Settings dialog box, click the radio button labeled **Server** *assigned IP address*. Also click the radio button labeled *Server assigned name server address*.
13. Click *OK* twice to confirm and save your changes, and then close the *Control Panel*.

Windows 95, 98 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. Double-click the Network icon.

   The *Network* dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.

3. If TCP/IP does not display as an installed component, click *Add…*

   The *Select Network Component Type* dialog box displays.
4. Select *Protocol*, and then click *Add…*

   The Select Network Protocol dialog box displays.

5. Click on *Microsoft* in the Manufacturers list box, and then click *TCP/IP* in the Network Protocols list box.
6. Click *OK* to return to the Network dialog box, and then click *OK* again.

   You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.
7. Click *OK* to restart the PC and complete the TCP/IP installation.

Next, configure the PCs to accept IP information assigned by the device:

8. Open the Control Panel window, and then click the Network icon.
9. Select the network component labeled TCP/IP, and then click *Properties*.

   If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.
10. In the TCP/IP Properties dialog box, click the IP Address tab.
11. Click the radio button labeled *Obtain an IP address automatically*.
12. Click the DNS Configuration tab, and then click the radio button labeled *Obtain an IP address automatically*.
13. Click *OK* twice to confirm and save your changes.

    You will be prompted to restart Windows.
14. Click *Yes*.

Windows NT 4.0 workstations

First, check for the IP protocol and, if necessary, install it:

1. In the Windows NT task bar, click the *Start* button, point to *Settings*, and then click *Control Panel*.
2. In the Control Panel window, double click the Network icon.
3. In the *Network dialog* box, click the *Protocols* tab.

   The *Protocols* tab displays a list of currently installed network protocols. If the list includes TCP/IP, then the protocol has already been enabled. Skip to step 9.
4. If TCP/IP does not display as an installed component, click *Add…*
5. In the *Select Network Protocol* dialog box, select *TCP/IP*, and then click *OK*.

   You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files.

   After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.
6. Click *Yes* to continue, and then click *OK* if prompted to restart your computer.

Next, configure the PCs to accept IP information assigned by the device:

7. Open the Control Panel window, and then double-click the Network icon.
8. In the *Network* dialog box, click the *Protocols* tab.
9. In the *Protocols* tab, select *TCP/IP*, and then click *Properties*.
10. In the *Microsoft TCP/IP Properties* dialog box, click the radio button labeled *Obtain an IP address from a DHCP server.*
11. Click *OK* twice to confirm and save your changes, and then close the Control Panel.

Assigning static Internet information to your PCs

If you are a typical user, you will not need to assign static Internet information to your LAN PCs because your ISP automatically assigns this information for you.

In some cases however, you may want to assign Internet information to some or all of your PCs directly (often called "statically"), rather than allowing the device to assign it. This option may be desirable (but not required) if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server).
- You maintain different subnets on your LAN (subnets are described in Appendix B).

Before you begin, you must have the following information available:

- The IP address and subnet mask of each PC
- The IP address of the default gateway for your LAN. In most cases, this is the address assigned to the LAN port on the device. By default, the LAN port is assigned the IP address *192.168.0.1*. (You can change this number or another number can be assigned by your ISP. See *Addressing* for more information.)
- The IP address of your ISP's Domain Name System (DNS) server.

On each PC to which you want to assign static information, follow the instructions relating only to checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying each of the Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server and default gateway, click the radio buttons that enable you to enter the information manually.

Note

Your PCs must have IP addresses that place them in the same subnet as the device's LAN port. If you manually assign IP information to all your LAN PCs, you can follow the instructions in Addressing to change the LAN port IP address accordingly.

B IP Addresses, Network Masks, and Subnets

IP Addresses

Note

This section refers only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.

This section assumes basic knowledge of binary numbers, bits, and bytes.

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information:

- *Network ID*
  Identifies a particular network within the Internet or intranet
- *Host ID*
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). The table below shows the structure of an IP address.

	Field1	Field2	Field3	Field4
Class A	Network ID	Host ID		
Class B	Network ID		Host ID	
Class C	Network ID			Host ID

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the

scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:
  field1 = 1-126: Class A
  field1 = 128-191: Class B
  field1 = 192-223: Class C
  (field1 values not shown are reserved for special uses)
- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

Subnet masks

Definition
mask

A mask *looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."*

Subnet masks are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field3 are part of the network ID, but note how the mask specifies that the first bit in field4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 1 to 126 hosts (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 1 to 62.

Note

Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a default subnet mask*. These masks are:*

Class A: 255.0.0.0
Class B: 255.255.0.0
Class C: 255.255.255.0

These are called default *because they are used when a network is initially configured, at which time it has no subnets.*

C UPnP Control Point Software on Windows ME/XP

This appendix provides instructions for configuring the UPnP on your computers to work with the device.

UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, Wireless devices, and PCs of all form factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. UPnP is a distributed, open networking architecture that leverages TCP/IP and the Web technologies to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and public spaces.

UPnP is more than just a simple extension of the plug and play peripheral model. It is designed to support zero-configuration, "invisible" networking, and automatic discovery for a breadth of device categories from a wide range of vendors. This means a device can dynamically join a network, obtain an IP address, convey its capabilities, and learn about the presence and capabilities of other devices. DHCP and DNS servers are optional and are used only if available on the network. Finally, a device can leave a network smoothly and automatically without leaving any unwanted state behind.

UPnP Control Point Software on Windows ME

To install the control point software on Windows ME:

1. In the Control Panel, select "Add/Remove Programs".

2. In the "Add/Remove Programs Properties" dialog box, select the "Windows Setup" tab. In the "Components" list, double click on the "Communications" entry.

3. In the "Communications" dialog box, scroll down the "Components" list to display the UPnP entry. Select the entry, click "OK".

4. Click "OK" to finish the "Add/Remove Programs" dialog.

5. Reboot your system.

Once you have installed the UPnP software and you have rebooted (and your network includes the IGD system), you should be able to see the IGD controlled device on your network.

UPnP Control Point Software on Windows XP with Firewall

On Windows XP versions earlier than SP2, Firewall support is provided by the Windows XP Internet Connection Firewall. You cannot use the Windows XP Internet Connection Firewall support on a system that you intend to use as a UPnP control point. If this feature is enabled, although the control point system may display controlled devices in the list of network devices, the control point system cannot participate in UPnP communication. (This restriction also applies to controlled devices running on Windows XP systems earlier than SP2.)

On Windows XP SP2 and later, Firewall support is provided by Windows Firewall. Unlike earlier versions, Windows XP SP2 can be used on a system that you intend to use as a UPnP control point.

To turn off the Firewall capability on any version of Windows XP, follow the steps below:

1. In the Control Panel, select "Network and Internet Connections".

2. In the "Network and Internet Connections" dialog box, select "Network Connections".

3. In the "Network Connections" dialog box, right-click on the local area connection entry for your network; this will display a menu. Select the "Properties" menu entry.

4. In the "Local Area Connection Properties" dialog box, select the "Advanced" tab. Disable the Internet Connection Firewall by de-selecting the entry with the following label:

"Protect my computer and network by limiting or preventing access to the computer from the Internet".

5. Click "OK".

SSDP requirements

You must have SSDP Discovery Service enabled on your Windows XP system to use the UPnP Control point software.

SSDP Discovery Service is enabled on a default installation of Windows XP. To check if it is enabled on your system, look in Control Panel > Administrative Tools > Services).

Installation procedure

To install the Control point software on Windows XP, follow the steps below:

1. In the Control Panel, select "Add/Remove Programs".

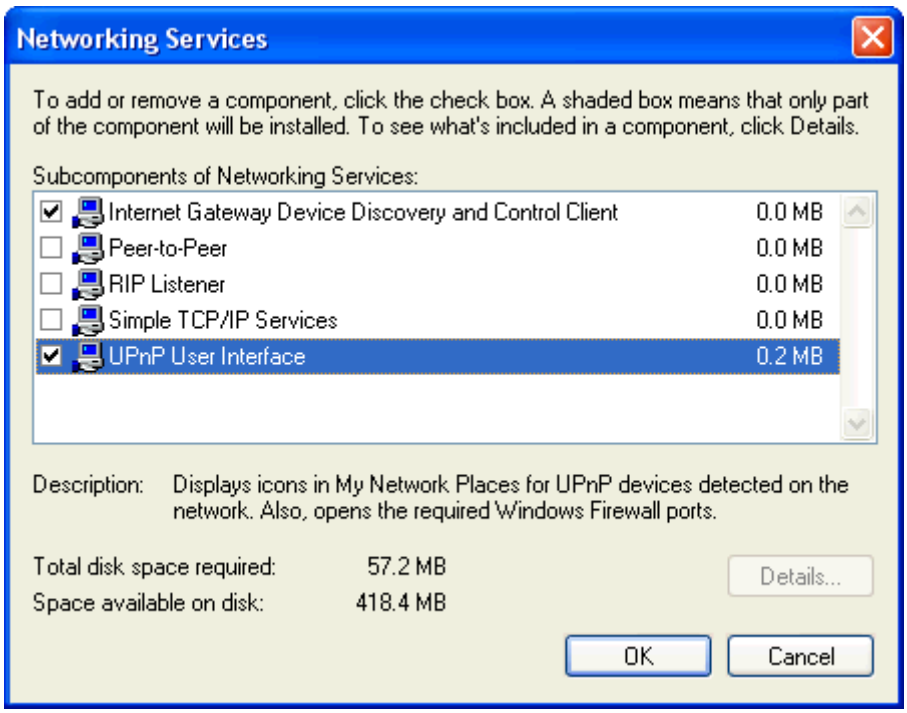
2. In the "Add or Remove Programs" dialog box, click the "Add / Remove Windows Components" button.

3. In the "Windows Component Wizard" dialog box, scroll down the list to display the "Networking Services" entry. Highlight (select) the entry, and click on the "Details" button.

4. The “Networking Services” window is displayed.

The subcomponents shown in the Networking Services window will be different depending on if you are using Windows XP, Windows XP (SP1), or Windows XP (SP2).

If you are using Windows XP SP2, the Networking Services window will display the following list of sub-components:


Networking Services
To add or remove a component, click the check box. A shaded box means that only part of the component will be installed. To see what's included in a component, click Details.
Subcomponents of Networking Services:
Internet Gateway Device Discovery and Control Client 0.0 MB
Peer-to-Peer 0.0 MB
RIP Listener 0.0 MB
Simple TCP/IP Services 0.0 MB
UPnP User Interface 0.2 MB
Description: Displays icons in My Network Places for UPnP devices detected on the network. Also, opens the required Windows Firewall ports.
Total disk space required: 57.2 MB
Space available on disk: 418.4 MB
Details...
OK
Cancel

5. Select the following entries from the “Networking Services” window and then click "OK":

If you are using **Windows XP**, select:

• "Universal Plug and Play".

If you are using **Windows XP SP1**, select:

• "Internet Gateway Device discovery and Control Client".

• "Universal Plug and Play".

If you are using **Windows XP SP2**, select:

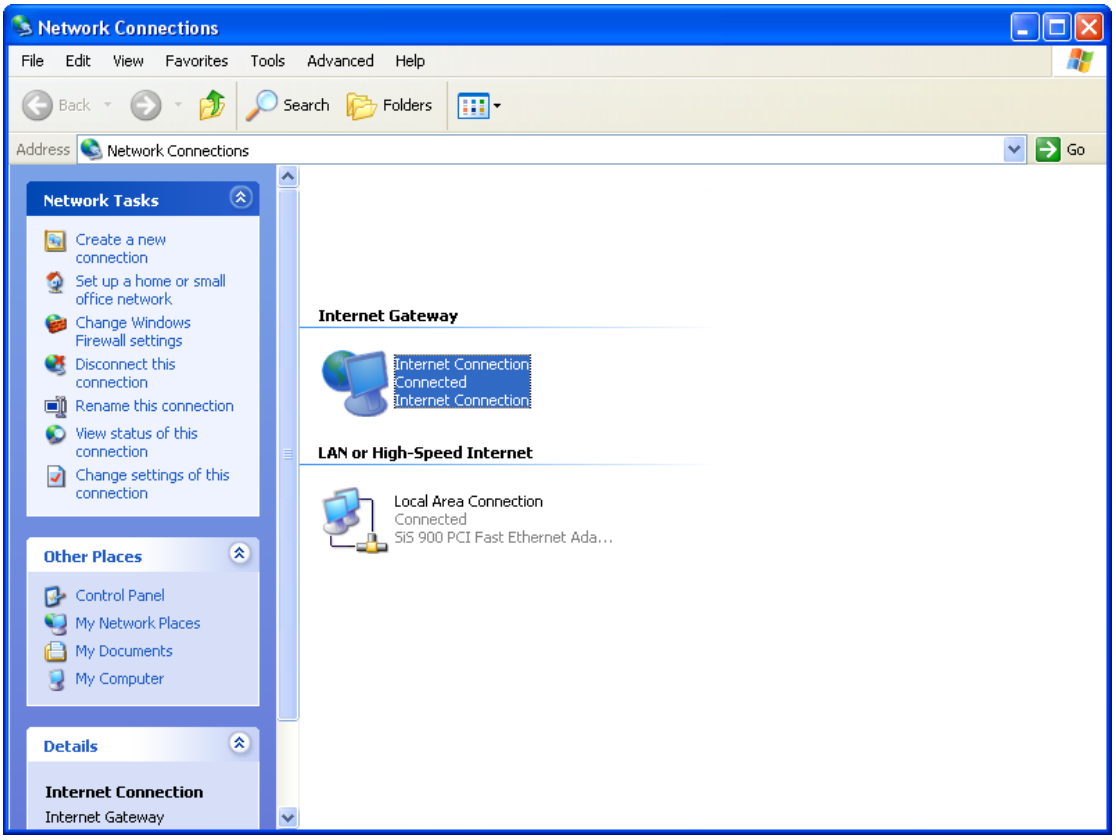
• "Internet Gateway Device discovery and Control Client".

• "UPnP User Interface".

6. Reboot your system.

Once you have installed the UPnP software and you have rebooted (and your network includes the IGD system), you should be able to see the IGD controlled device on your network.

For example, from the Network Connections window you should see the Internet Gateway Device:



D Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the device, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

Troubleshooting Suggestions

Problem	Troubleshooting Suggestion
LEDs	
Power LED does not illuminate after product is turned on.	Verify that you are using the power cable provided with the device and that it is securely connected to the device and a wall socket/power strip.
LINK LAN LED does not illuminate after Ethernet cable is attached.	Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the device. Make sure the PC and/or hub is turned on. Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (10BaseTx) should use cables labeled CAT 5. A 10Mbit/sec network may tolerate lower quality cables.
Internet Access	
My PC cannot access the Internet	Use the ping utility (discussed in the following section) to check whether your PC can communicate with the device's LAN IP address (by default 192.168.0.1). If it cannot, check the Ethernet cabling. If you statically assigned a private IP address to the computer, (not a registered public address), verify the following: • Check that the gateway IP address on the computer is your public IP address (see Current Status for instructions on viewing the IP information.) If it is not, correct the address or configure the PC to receive IP information automatically. • Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information automatically.
My LAN PCs cannot display web pages on the Internet.	Verify that the DNS server IP address specified on the PCs is correct for your ISP, as discussed in the item above. If you specified that the DNS server be assigned dynamically from a server, then verify with your ISP that the address configured on the device is correct, then You can use the ping utility, to test connectivity with your ISP's DNS server.
Web pages	

Problem	Troubleshooting Suggestion
I forgot/lost my user ID or password.	If you have not changed the password from the default, try using "admin" the user ID and "administrator" as password. Otherwise, you can reset the device to the default configuration by pressing the Reset Default button on the Rare panel of the device (see *Rare Panel*). Then, type the default User ID and password shown above. **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values.
I cannot access the web pages from my browser.	Use the ping utility, discussed in the following section, to check whether your PC can communicate with the device's LAN IP address (by default 192.168.0.1). If it cannot, check the Ethernet cabling. Verify that you are using Internet Explorer or Netscape Navigator v4.0 or later. Verify that the PC's IP address is defined as being on the same subnet as the IP address assigned to the LAN port on the device.
My changes to the web pages are not being retained.	Be sure to use the *Confirm Changes/Apply* function after any changes.

Diagnosing Problem using IP Utilities

ping

Ping is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type a statement such as the following:

ping 192.168.0.1

Click *OK*. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a *Command Prompt* window is displayed:

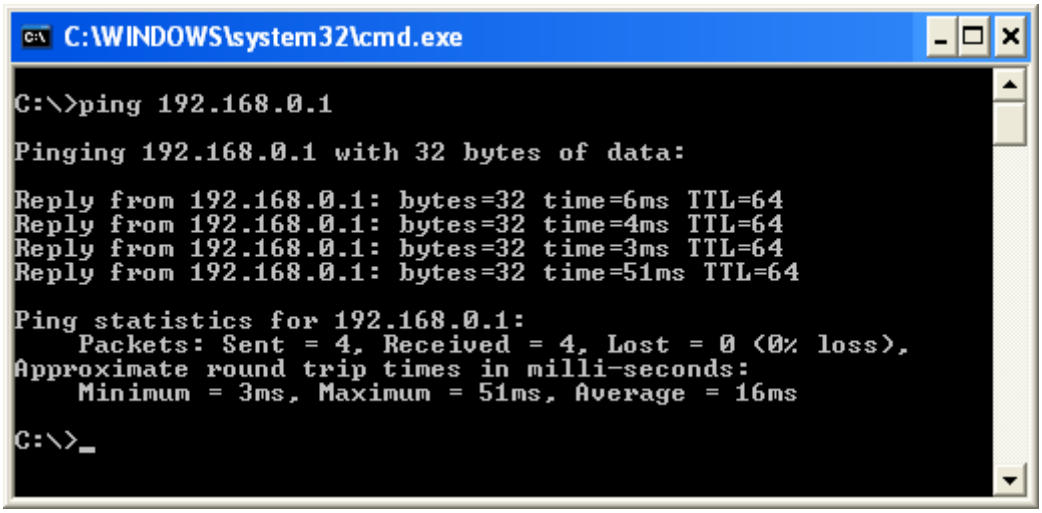

C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.1
Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1: bytes=32 time=6ms TTL=64
Reply from 192.168.0.1: bytes=32 time=4ms TTL=64
Reply from 192.168.0.1: bytes=32 time=3ms TTL=64
Reply from 192.168.0.1: bytes=32 time=51ms TTL=64
Ping statistics for 192.168.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 3ms, Maximum = 51ms, Average = 16ms
C:\>

Figure 11: Using the ping Utility

If the target computer cannot be located, you will receive the message *Request timed out*.

Using the ping command, you can test whether the path to the device is working (using the preconfigured default LAN IP address 192.168.0.1) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for *www.yahoo.com* (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the *nslookup* command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

nslookup

You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name

in on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the *Start* menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type the following:

Nslookup

Click *OK*. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address that you are interested in, such as *www.microsoft.com*.

The window will display the associate IP address, if known, as shown below:

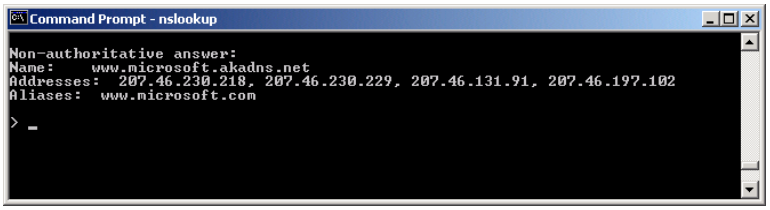


Figure 12: Using the nslookup Utility

There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **[Enter]** at the command prompt.

E Glossary

10BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. See *data rate, Ethernet*.

100BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. See *data rate, Ethernet*.

ADSL Asymmetric Digital Subscriber Line
The most commonly deployed "flavor" of DSL for home users is asymmetrical DSL. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload.

analog An analog signal is a signal that has had its frequency modified in some way, such as by amplifying its strength or varying its frequency, in order to add information to the signal. The voice component in DSL is an analog signal. See *digital*.

ATM Asynchronous Transfer Mode
A standard for high-speed transmission of data, text, voice, and video, widely used within the Internet. ATM data rates range from 45 Mbps to 2.5 Gbps. See *data rate*.

authenticate To verify a user's identity, such as by prompting for a password.

binary The "base two" system of numbers, that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. See *bit, IP address, network mask*.

bit Short for "binary digit," a bit is a number that can have two values, 0 or 1. See *binary*.

bps bits per second

bridging Passing data from your network to your ISP and vice versa using the hardware addresses of the devices at each location. Bridging contrasts with routing, which can add more intelligence to data transfers by using network addresses instead. The device can perform both routing and bridging. Typically, when both functions are enabled, the device routes IP data and bridges all other types of data. See *routing*.

broadband A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology.

broadcast To send data to all computers on a network.

DHCP Dynamic Host Configuration Protocol
DHCP automates address assignment and management.

	When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool.
DHCP relay	Dynamic Host Configuration Protocol relay A DHCP relay is a computer that forwards DHCP data between computers that request IP addresses and the DHCP server that assigns the addresses. Each of the device 's interfaces can be configured as a DHCP relay. See *DHCP*.
DHCP server	Dynamic Host Configuration Protocol server A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. See *DHCP*.
digital	Of data, having a form based on discrete values expressed as binary numbers (0's and 1's). The data component in DSL is a digital signal. See *analog*.
DNS	Domain Name System The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers called DNS servers. For example, *www.yahoo.com* is the domain name associated with IP address 216.115.108.243. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. See *domain name.*
domain name	A domain name is a user-friendly name used in place of its associated IP address. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site. See *DNS.*
download	To transfer data in the downstream direction, i.e., from the Internet to the user.
DSL	Digital Subscriber Line A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines.
encryption keys	See *network keys*
Ethernet	The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. *See also 10BASE-T, 100BASE-T, twisted pair*.
FTP	File Transfer Protocol A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server.
Gbps	Abbreviation of Gigabits per second, or one billion bits per second. Internet data rates are often expressed in Gbps.
host	A device (usually a computer) connected to a network.
HTTP	Hyper-Text Transfer Protocol HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. See *web browser, web site*.

Hub	A hub is a place of convergence where data arrives from one or more directions and is forwarded out in one or more directions. It connects an Ethernet bridge/router to a group of PCs on a LAN and allows communication to pass between the networked devices.
ICMP	Internet Control Message Protocol An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP.
IEEE	The Institute of Electrical and Electronics Engineers is a technical professional society that fosters the development of standards that often become national and international standards.
Internet	The global collection of interconnected networks used for both private and business communications.
intranet	A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees.
IP	*See TCP/IP*.
IP address	Internet Protocol address The address of a host (computer) on the Internet, consisting of four numbers, each from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a *network ID* that identifies the particular network the host belongs to, and a *host ID* uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. See *domain name, network mask*.
ISP	Internet Service Provider A company that provides Internet access to its customers, usually for a fee.
LAN	Local Area Network A network limited to a small geographic area, such as a home or small office.
LED	Light Emitting Diode An electronic light-emitting device. The indicator lights on the front of the device are LEDs.
MAC address	Media Access Control address The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of hex characters, with each pair separated by colons. For example; *NN:NN:NN:NN:NN:NN*.
mask	*See network mask*.
Mbps	Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps.
NAT	Network Address Translation A service performed by many routers that translates your network's publicly known IP address into a *private* IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN.
network	A group of computers that are connected together, allowing them to communicate with each other and share resources,

	such as software, files, etc. A network can be small, such as a *LAN*, or very large, such as the *Internet*.
network mask	A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. See *binary, IP address, subnet*.
NIC	Network Interface Card An adapter card that plugs into your computer and provides the physical interface to your network cabling. For Ethernet NICs this is typically an RJ-45 connector. See *Ethernet, RJ-45*.
packet	Data transmitted on a network consists of units called packets. Each packet contains a payload (the data), plus overhead information such as where it came from (source address) and where it should go (destination address).
ping	Packet Internet (or Inter-Network) Groper A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name.
port	A physical access point to a device such as a computer or router, through which data flows into and out of the device.
PPP	Point-to-Point Protocol A protocol for serial data transmission that is used to carry IP (and other protocol) data between your ISP and your computer. The WAN interface on the device uses two forms of PPP called PPPoA and PPPoE. See *PPPoA, PPPoE*.
PPPoA	Point-to-Point Protocol over ATM One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoE. You can define only one PPPoA interface per VC.
PPPoE	Point-to-Point Protocol over Ethernet One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoA. You can define one or more PPPoE interfaces per VC.
protocol	A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol.
remote	In a physically separate location. For example, an employee away on travel who logs in to the company's intranet is a remote user.
RIP	Routing Information Protocol The original TCP/IP routing protocol. There are two versions of RIP: version I and version II.
RJ-11	Registered Jack Standard-11 The standard plug used to connect telephones, fax machines, modems, etc. to a telephone port. It is a 6-pin connector usually containing four wires.
RJ-45	Registered Jack Standard-45 The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector.

routing	Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router.
SDNS	Secondary Domain Name System (server) A DNS server that can be used if the primary DSN server is not available. *See DNS*.
subnet	A subnet is a portion of a network. The subnet is distinguished from the larger network by a *subnet mask* that selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. See *network mask*.
subnet mask	A mask that defines a subnet. See *network mask*.
TCP	See *TCP/IP*.
TCP/IP	Transmission Control Protocol/Internet Protocol The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols.
Telnet	An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location.
TFTP	Trivial File Transfer Protocol A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure.
TKIP	Temporal Key Integrity Protocol (TKIP) provides WPA with a data encryption function. It ensures that a unique master key is generated for each packet, supports message integrity and sequencing rules and supports re-keying mechanisms.
triggers	Triggers are used to deal with application protocols that create separate sessions. Some applications, such as NetMeeting, open secondary connections during normal operations, for example, a connection to a server is established using one port, but data transfers are performed on a separate connection. A trigger tells the device to expect these secondary sessions and how to handle them. Once you set a trigger, the embedded IP address of each incoming packet is replaced by the correct host address so that NAT can translate packets to the correct destination. You can specify whether you want to carry out address replacement, and if so, whether to replace addresses on TCP packets only, UDP packets only, or both.
twisted pair	The ordinary copper telephone wiring used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category

3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. See *10BASE-T, 100BASE-T, Ethernet*.

unnumbered interfaces

An unnumbered interface is an IP interface that does not have a local subnet associated with it. Instead, it uses a *router-id* that serves as the source and destination address of packets sent to and from the router. Unlike the IP address of a normal interface, the router-id of an unnumbered interface is allowed to be the same as the IP address of another interface. For example, the WAN unnumbered interface of your device uses the same IP address of the LAN interface (192.168.0.1).

The unnumbered interface is temporary – PPP or DHCP will assign a 'real' IP address automatically.

upstream The direction of data transmission from the user to the Internet.

VC Virtual Circuit
A connection from your DSL router to your ISP.

VCI Virtual Circuit Identifier
Together with the Virtual Path Identifier (VPI), the VCI uniquely identifies a VC. Your ISP will tell you the VCI for each VC they provide. See *VC*.

VPI Virtual Path Identifier
Together with the Virtual Circuit Identifier (VCI), the VPI uniquely identifies a VC. Your ISP will tell you the VPI for each VC they provide. See *VC*.

WAN Wide Area Network
Any network spread over a large geographical area, such as a country or continent. With respect to the device, WAN refers to the Internet.

Web browser A software program that uses Hyper-Text Transfer Protocol (HTTP) to download information from (and upload to) web sites, and displays the information, which may consist of text, graphic images, audio, or video, to the user. Web browsers use Hyper-Text Transfer Protocol (HTTP). Popular web browsers include Netscape Navigator and Microsoft Internet Explorer. See *HTTP, web site, WWW*.

Web page A web site file typically containing text, graphics and hyperlinks (cross-references) to the other pages on that web site, as well as to pages on other web sites. When a user accesses a web site, the first page that is displayed is called the *home page*. See *hyperlink, web site*.

Web site A computer on the Internet that distributes information to (and gets information from) remote users through web browsers. A web site typically consists of web pages that contain text, graphics, and hyperlinks. See *hyperlink, web page*.

WWW World Wide Web

Also called *(the) Web.* Collective term for all web sites anywhere in the world that can be accessed via the Internet.